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ABSTRACT

This document contains teaching modules based on 20 objectives in grade 5 mathematics. The modules may be used for program evaluation and curricular planning as well as detailed outlines for classroom activities. Each module has eight section: (1) "Objective"; (2) "Explanation of Objective"; (3) "Prerequisite Skills"; (4) "Vocabulary"; (5) "Lesson Plan Outline" (providing suggestions for introducing the objective, daily activities, and a culuminating activity); (6) "Materials" (listing needed manipulatives and exhibits); (7) "Sample Test I"; and (8) "Sample Test II." The appendices include: "Mississippi Basic Skills Mathematics--Grade 5"; "Grade Five--Answer Key to Sample Tests"; and "Diagnostic/Prescriptive Evaluation Sheets" (fifth grade Basic Skills Assessment Program mathematics objectives). (YP)

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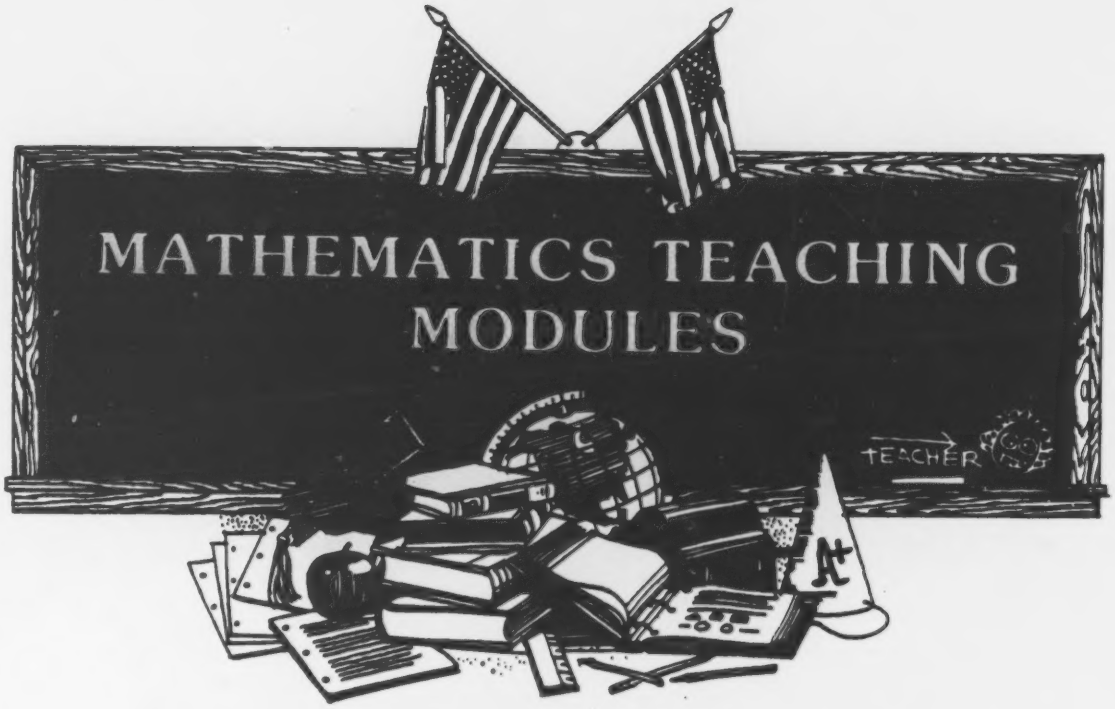

BASIC SKILLS ASSESSMENT PROGRAM

GRADE FIVE

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MATHEMATICS TEACHING MODULES

BASIC SKILLS ASSESSMENT PROGRAM
GRADE FIVE

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Preface

The materials contained in this document were developed in response to recommendations of The Mississippi Mathematics Improvement Task Force. The task force, appointed by Richard A. Boyd, recommended major steps that the State Board of Education should take to improve the level of mathematics competence of public school students.

The State Department of Education entered into a contract with Delta State University to assess the specific problems students in grades 3 and 5 were encountering on the Basic Skills Assessment Program subtest of mathematical skills. The results of this needs assessment led to the development of the Mathematics Teaching Modules.

Dr. Becky Lynchard developed the text for these modules. Dr. Rose Strahan served as project consultant. Dr Reid Jones administered the project and the field test of the teaching materials. Dr. Gene Hamon was responsible for computer-based publishing. Dr. Larry Hailey was responsible for long range curriuculum planning.

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Teacher's Guide

Uses for the Teacher

The Teaching Modules may be used for program evaluation and curricular planning as well as detailed outlines for classroom activities. They have been designed for diagnostic/prescriptive use in teaching and reteaching, remediation efforts, extended school sessions, or for individual tutoring.

Parts of the Modules

Each teaching module contains eight sections:

1. **Objective**--brief statement of the Basic Skills objective
2. **Explanation of Objective**--brief comments on how the objective will be measured on the BSAP
3. **Prerequisite Skills**--skills that are essential for understanding the objective, listed in descending order from most difficult to least difficult
4. **Vocabulary**--the words and definitions which are needed to understand the objective
5. **Lesson Plan Outline**--suggestions for introducing the objective, detailed activities for several days of instruction, and a culminating activity
6. **Materials**--lists of needed manipulatives and exhibits
7. **Sample Test I**
8. **Sample Test II**

Cautions

The modules should not be used as the entire mathematics teaching effort for grades three and five. Since the modules are keyed to the BSAP skills, they represent only a subset of the basic skills outlined in the *State Curriculum Structure*. and very little emphasis is placed on higher order thinking skills.

The TIPS are refined annually; however, this does not change test content or objective numbers. Further, all students at grades 3 and 5 will be using an answer format on the BSAP which requires them to darken in 1 of 4 circles on the test booklet rather than choose from the traditional multiple choice format of alternatives "A through D".

Appended Materials

The appendices contain the following:

Appendix A--List of BSAP Mathematics Skills

Appendix B--Answer Sheets for Sample Tests

Appendix C--State Averages on BSAP Mathematics

APPENDIX A

Mississippi Basic Skills
Mathematics--Grade 5

5.1 Read and write numerals through 1,000,000

5.2 Round numbers to nearest ten, hundred, or thousand

5.3 Change improper fractions to mixed numbers

5.4 Simplify proper fractions

5.5 Add up to four 5-digit whole numbers, regrouping as necessary

5.6 Subtract through 5-digit whole numbers, regrouping as necessary

5.7 Multiply through 3-digit by 2-digit whole numbers, regrouping as necessary

5.8 Divide by a 1-digit whole number divisor

5.9 Divide by a multiple of ten

5.10 Add two fractions with like denominators, renaming the sum as a mixed number or simple fraction. Subtract two fractions with like denominators

5.11 Add with decimals through hundredths. Subtract with decimals through hundredths

5.12 Tell time to the nearest minute

5.13 Identify unit of measure (English or metric) for problems involving length, capacity, or weight

5.14 Identify relationships between English or metric units of measure: capacity, length, and weight

5.15 Determine weight to the nearest pound or kilogram. Measure length to the nearest centimeter or quarter inch

5.16 Read temperature on Fahrenheit and Celsius scales

5.17 Solve word problems involving whole numbers, using one operation

5.18 Solve word problems involving whole numbers, using two operations

5.19 Solve word problems involving money, using addition and subtraction

5.20 Interpret bar graphs, pictographs, or circle graphs

GRADE FIVE - ANSWER KEY TO SAMPLE TESTS

Objective #	Sample Test 1 (Pre-test)[1] Item #										Sample Test 2 (Post-test)[1] Item #									
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5.1	B	C	A	B	D	[A	C	B	D	B]	C	A	D	B	A	[D	A	B	D	A]
5.2	B	D	A	B	C	A	D	B	C	D	A	C	B	B	D	A	B	A	D	B
5.3	B	A	C	A	D	C	B	B	D	A	C	D	A	A	B	D	C	A	B	D
5.4	B	A	A	C	D	D	C	D	A	B	C	D	A	A	B	C	A	D	B	C
5.5	D	A	B	C	A	B	C	B	D	A	B	D	A	C	B	C	D	A	B	A
5.6	B	A	C	A	B	D	D	A	C	C	D	A	B	C	C	A	B	B	A	D
5.7	C	A	D	C	D	B	A	B	C	D	A	C	B	B	D	C	A	D	D	B
5.8	D	A	B	B	A	C	C	D	D	B	A	C	D	C	A	B	B	B	D	A
5.9	B	A	B	C	D	A	C	B	A	C	D	A	B	B	C	D	A	B	A	D
5.10	B	A	D	B	C	[A	D	C	D	B]	B	A	C	A	D	[C	A	D	C	B]
5.11	D	A	C	B	B	[A	B	D	B	C]	D	D	C	A	B	[C	B	A	D	B]
5.12[2]	B	A	D	C	B	D	C	C	A	D	C	D	A	A	C	A	B	C	B	B
5.13[2]	A	C	D	A	B	B	C	D	B	A	A	D	B	D	C	D	C	A	C	A
5.14	A	C	D	A	C	B	C	A	B	A	C	A	B	B	D	A	C	C	A	A
5.15	A	A	C	B	C	B	B	B	D	B	D	B	D	A	D	B	B	B	A	B
5.16	D	A	C	D	B	C	C	A	C	D	A	B	C	C	B	D	A	D	C	A
5.17[3]	B	B	A	C	D	C	A	B	D	A	C	A	D	B	B	A	D	C	B	D
5.18	C	A	B	A	D	B	C	A	C	D	B	A	D	B	A	D	B	C	D	A
5.19	D	A	B	C	A	C	B	D	D	B	D	A	B	C	A	C	B	D	D	B
5.20	A	B	D	C	C	B	B	C	D	A	D	C	B	A	B	A	B	B	D	D

[1] Please note that when an objective is composed of Part 1 (items 1 through 5) and Part 2 (items 6 through 10), that we have listed the answers in sequence. This occurs on Objectives 5.1, 5.10, and 5.11. We have put brackets around the items that occur as Part Two in these Sample Tests. Thus, on these tests, Part 2 is numbered as 1 through 5, just as they were in Part 1. However, the answer key table list them as 6 through 10.

[2] There are 16 items on each of the Sample Tests for Objective #5.13. The answers for the additional items are as follows: Sample Test 1: #11) C, 12) A, 13) D, 14) B, 15) A, and 16) C.
Sample Test 2: #11) B, 12) A, 13) B, 14) A, 15) B, and 16) C.

[3] Objective 5.18 has not been tested on the BSAP, although a TIPS Sheet exists for this skill. We do recommend that classes cover the material, which has considerable diagnostic value for how students are approaching word problems.

DIAGNOSTIC/PRESCRIPTIVE EVALUATION SHEETS

Fifth Grade BSAP Mathematics Objectives

OBJ#	Description (For exact wording, see Modules)	State Averages[1] 1987	1988[2]	1989[2]	Student, class, school, or district 1	2	Priority Rank
5.1	Read and write numerals through 1,000,000.	96.2	96.4	93.8			
5.2	Round numbers to nearest ten, hundred, or thousand.	73.5	71.6	69.7			
5.3	Change improper fractions to mixed numbers.	76.5	81.4	80.8			
5.4	Simplify proper fractions.	68.3	74.4	75.7			
5.5	Add four 5-digit whole numbers, regrouping as needed.	92.9	91.6	92.6			
5.6	Subtract 5-digit whole numbers, regrouping as needed.	83.8	87.2	87.9			
5.7	Multiply 3-digit by 2-digit numbers with regrouping.	80.8	83.3	83.1			
5.8	Divide by a 1-digit whole number divisor.	84.5	84.4	85.7			
5.9	Divide by a multiple of ten.	73.2	75.2	76.5			
5.10	Add/subtract fractions with same denominator. Rename.	79.4	79.7	72.2			
5.11	Add/subtract with like decimals through hundreths.	87.7	86.8	90.7			
5.12	Tell time to the nearest minute.	86.1	91.0	91.7			
5.13	Identify appropriate unit (length, capacity, weight).	59.2	62.3	60.7			
5.14	Identify relationships between English & Metric Units.	44.6	59.2	62.1			
5.15	Determine weight to nearest lb./kg; length to cm/inch.	87.6[4]	88.7	86.9			
5.16	Read temperature on Fahrenheit or Celsius scales.	87.6[4]	96.0	96.6			
5.17	Solve word problems with one operation.	71.5[4]	70.2	74.0			
5.18[3]	Identify sequence of operations used in word problems.	----	----	----			
5.19	Solve word problems using money (add or subtract).	71.5[4]	80.3	79.8			
5.20	Interpret bar graphs, pictographs, or circle graphs.	93.2	85.5	97.3			
TOTALS[5]		78.3	81.3	82.0			

Notes:

[1] Data sources include State Department for 1978; Pupil Performance (from SDE) for 1988 and 1989.
[2] Minor modifications on the BSAP were in 1988, also affecting 1989 scores.
[3] Objective 5.18 has never been tested on the BSAP.
[4] During 1987 testing, Objectives 5.15 & 5.16 were combined, as were Objectives 5.17 & 5.19. Consequently, the table shows the average score for the combined tests in two locations. On later BSAP years, separate tests were given.
[5] Based on averages reported above.

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.1

Read and write numerals through 1,000,000.

Explanation of Objective

Identify numerals greater than 999 but less than 1,000,001 by matching numerals with word names.

Prerequisite Skills (descending order)

(a) Read and write numerals through five-digit numerals.
(b) **Master Objective 3.2 (i.e., identify number words through thousands.).**

Vocabulary

numeral
word name
word name for numerals from one thousand through one million

Lesson Plan Outline

Introduction:

Show a numeral card with the numeral "1,862" on it. Say "one thousand, eight hundred sixty-two." Then write the words "one thousand eight hundred sixty-two" on the board. Remind students that just as every person has a word name so does every number. Show other numeral cards up to 9,999 and follow the same procedure. Call attention to the hyphen separating the tens and ones. Have a few students write the word names for some of the other numerals on the board.

Activities:

Day 1:

1. Give each student either a card showing a numeral or a card showing a word name for a number. Tell students they must match the numeral with their word names. Each student must find the person holding the card that matches his/her own card. When a match is made, the two students must sit down. When all matches have been made, let each group read its numeral and show its word name. Collect the cards, mix them, and distribute them again making sure that no student receives a card he has had before. Play the game again. Repeat the game two or three times.

2. Have pairs of students use the red and blue popsicle sticks described in TM Math - 3.1 so that one student represents numbers with the sticks and the other student writes the numeral and its word name.

Day 2:

1. Extend the introduction activity to include numbers and their word names to 99,999.

2. Play a relay game where each team is given an identical set of cards (one card per team member) showing word names for numbers to 99,999. When a numeral from the cards is called, the person from each team holding the card must go to the board and write that numeral on the board and return to his/her place. The first to finish scores a point for his/her team. The team with the most points at the end of the game wins.

3. Extend Activity #2 Day 1 to include the green popsicle sticks.

Day 3:

1. Extend the introduction activity to include numbers and their word names to 999,999.

2. Play the matching game described in Activity #1 Day 1 but include numbers to 999,999.

3. Extend Activity #3 Day 2 to include the orange popsicle sticks.

Culmination:

Check students' understanding of word names for numbers by writing a word name on the board and having students write the corresponding numeral on their own individual chalkboards or blank 3 x 5 cards. Students should show the number they have written so that a quick assessment can be made.

Materials

Introduction:

1. Cards showing numerals to 9,999

Day 1:

1. Pairs of cards where one card shows a numeral to 9,999 and its match shows the word name for the number

Example:

2,346	two-thousand, three hundred forty-six

2. Red and blue popsicle sticks

Day 2:

1. Cards showing numerals to 99,999

2. Two identical sets of cards showing word names for numbers to 99,999

3. Red, blue, and green popsicle sticks

Day 3:

1. Cards showing numerals to 999,999

2. Pairs of cards where one card shows a numeral to 999,999 and its match shows the word name for the number

3. Red, blue, green, and orange popsicle sticks

Culmination:

Individual chalkboards and chalk or a set of 3 x 5 cards for each student

Sample Tests

Test 1

Part I Directions: Look at the numeral. Choose its word name. Mark your choice on the answer sheet.

1. 36,499

   (a) thirty-six four hundred ninety-nine
   (b) thirty-six thousand four hundred ninety-nine
   (c) thirty-six million four hundred ninety-nine
   (d) thirty-six thousand four hundred ninety-nine thousand

2. 1,000,000

   (a) one hundred thousand
   (b) one thousand million
   (c) one million
   (d) one thousand

3. 5,615

   (a) five thousand six hundred fifteen
   (b) five thousand six hundred fifty-one
   (c) fifty-six thousand fifteen
   (d) five thousand sixty-five

4. 302,145

   (a) thirty-two thousand one hundred forty-five
   (b) three hundred two thousand one hundred forty-five
   (c) three hundred twenty thousand one hundred forty-five
   (d) three million two thousand one hundred forty-five

5. 17,208

   (a) seventeen thousand two hundred eighty
   (b) seventeen thousand twenty-eight
   (c) seventeen two hundred eight thousand
   (d) seventeen thousand two hundred eight

Test 1 (cont.)

Part II Directions: Look at the word name. Choose the matching numeral. Mark your choice on the answer sheet.

1. Two hundred thousand three hundred thirty-seven

   (a) 200,337
   (b) 2,000,337
   (c) 20,337
   (d) 2,337

2. Eighty-nine thousand four hundred seven

   (a) 89,470
   (b) 890,407
   (c) 89,407
   (d) 894,007

3. One thousand six

   (a) 1,060
   (b) 1,006
   (c) 1,600
   (d) 10,006

4. Forty-two thousand twelve

   (a) 42,120
   (b) 420,012
   (c) 402,102
   (d) 42,012

5. Six hundred seventy-one thousand five hundred twenty-three

   (a) 671,532
   (b) 671,523
   (c) 67,123
   (d) 67,153

Sample Tests

Test 2

Part I Directions: Look at the numeral. Choose its word name. Mark your choice on the answer sheet.

1. 11,430

   (a) Eleven thousand four hundred three
   (b) Eleven thousand forty-three
   (c) Eleven thousand four hundred thirty
   (d) Eleven forty-three thousand

2. 102,549

   (a) One hundred two thousand five hundred forty-nine
   (b) One hundred twenty thousand five hundred forty-nine
   (c) Twelve thousand five hundred forty-nine
   (d) Ten thousand two hundred fifty-four

3. 2,400

   (a) Two hundred forty
   (b) Two thousand four
   (c) Two thousand forty
   (d) Two thousand four hundred

4. 981,678

   (a) Nine hundred eighteen thousand six hundred seventy-eight
   (b) Nine hundred eighty-one thousand six hundred seventy-eight
   (c) Nine hundred eighty-one six hundred seventy-eight
   (d) Nine hundred eighty-one thousand seventy-eight

5. 66,307

   (a) Sixty-six thousand three hundred seven
   (b) Sixty-six thousand three hundred seventy
   (c) Sixty-six thousand three hundred
   (d) Sixty-six thousand thirty-seven

Test 2 (cont.)

Part II Directions: Look at the word name. Choose the matching numeral. Mark your choice on the answer sheet.

1. One hundred one thousand eleven

   (a) 11,011
   (b) 100,011
   (c) 101,101
   (d) 101,011

2. Fifty-five thousand one hundred thirty-six

   (a) 55,136
   (b) 55,163
   (c) 551,360
   (d) 5,513

3. Four thousand seven hundred one

   (a) 4,700
   (b) 4,701
   (c) 4,071
   (d) 4,710

4. Eighty-nine thousand five

   (a) 89,500
   (b) 89,050
   (c) 890,005
   (d) 89,005

5. Two hundred twenty-six thousand seven hundred forty-seven

   (a) 226,747
   (b) 226,774
   (c) 226,707
   (d) 22,747

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.2

Round numbers to nearest ten, hundred, or thousand.

Explanation of Objective

Round numbers greater than 10 but less than 99,000 to the nearest ten, hundred, or thousand.

Prerequisite Skills (descending order)

(a) Use a number line to compare two numbers.
(b) Compare two five-digit numbers using >, <, and =.
(c) Identify the numbers coming before, between or after given numbers 10,000 - 99,000.
(d) Compare two four-digit numbers using >, <, and =.
(e) Identify the place value of a given digit in a four-digit numeral.
(f) Identify the numbers coming before, between or after given numbers 1,000 - 9,999.
(g) Compare two three-digit numbers using >, <, and =.
(h) Identify the place value of a given digit in a three-digit numeral.
(i) Identify the numbers coming before, between or after given numbers 100 - 999.
(j) Compare two two-digit numbers using >, <, and =.
(k) Identify the place value of a given digit in a two-digit numeral.
(l) Identify the numbers coming before, between or after given numbers 0 - 99.

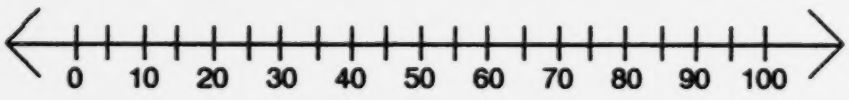
Vocabulary

round
nearest
ten
hundred
thousand
digit

Lesson Plan Outline

Introduction:

Draw a number line from 0 to 100 on the chalkboard. For example:



Also, write the number 31 on the board. Ask a student to locate 31 on the number line. Then, ask students whether 31 is nearer to 30 (3 tens) or 40 (4 tens). Tell students that finding the nearest ten to the number in question is called rounding the number to the nearest ten. Ask the same question for all the numbers between 30 and 40, except 35. Then, ask whether 35 is nearer to 30 or 40. Tell the students that the number in the ones place always determines whether the tens digit increases or not. If the ones digit is 0, 1, 2, 3, or 4, the tens digit stays the same. If the ones digit is 5, 6, 7, 8, or 9, the tens digit increases by 1. Therefore, even though 35 is in the middle of 30 and 40, since the ones digit is 5, the tens digit increases to 4 making the rounded number 40. Give several other examples of rounding numbers to the nearest ten. Be sure to demonstrate rounding not only to the nearest ten with two-digit numbers, but also with three-digit, four-digit, and five-digit numbers.

Activities:

Day 1:

1. Have pairs of students work together and take turns drawing a card showing a two-, three-, four-, or five-digit number to be rounded to the nearest ten. Each student must round the number he/she draws and, if correct, must keep the card. If incorrect, the card must be returned to the pile (Correct answers should be written on the backs of cards.). Encourage students to draw number lines for assistance. Students should continue drawing cards until all are gone. The student with the most cards at the end of the game wins.

2. Tell students that drawing a number line every time a number needs to be rounded can become very time-consuming. A number can be rounded more quickly by examining the digit to the right of the place to which we are rounding. Provide an example of rounding to the nearest ten with a two-, three-, four-, and five-digit number. For example:

36 593 1248 70,192

As you illustrate how to round these numbers to the nearest ten, list the following steps on the chalkboard and perform each step as you explain:

1. Underline the digit to which you are rounding.
2. Put an X on the number to the right of the number you underlined.
3. Is the number with the X 5 or more?
4. If so, round the number up.

Stress that the numbers to the left of the digit to which you are rounding or the underlined digit should not be examined and do not affect the numbers being rounded. After demonstrating the step-by-step procedure described above, the board should

look as follows:

36	593	1248	70,192
40	590	1250	70,190

Provide additional examples.

3. Have pairs of students practice rounding two-, three-, four-, and five-digit numbers to the nearest ten using the step-by-step procedure described in Activity #2 Day 1. Write the numbers to be rounded on 3 x 5 cards and play the game described in Activity #1 Day 1. Students should be allowed to draw number lines for assistance until they feel comfortable with the step-by-step procedure.

Day 2:

1. Adapt the introduction activity to introduce rounding three-, four-, and five-digit numbers to the nearest hundred.

2. Extend Activity #1 Day 1 by using cards with three-, four-, and five-digit numbers but having students round to the nearest hundred.

3. Adjust Activity #2 Day 1 to introduce the step-by-step procedure for rounding numbers to the nearest hundred. Three-,four-, and five-digit numbers should be used.

4. Have pairs of students play the game used in Activity #3 Day 1. Follow the same procedure except have students round to the nearest hundred rather than the nearest ten.

Day 3:

1. Adapt the introduction activity to introduce rounding four- and -five-digit numbers to the nearest thousand.

2. Extend Activity #1 Day 1 by using cards with four- and five-digit numbers but having students round to the nearest thousand.

3. Adjust Activity #2 Day 1 to introduce the step-by-step procedure for rounding numbers to the nearest thousand. Four- and five-digit numbers should be used.

4. Have pairs of students play the game used in Activity #3 Day 1. Follow the same procedure except have students round to the nearest thousand rather than the nearest ten.

Culmination:

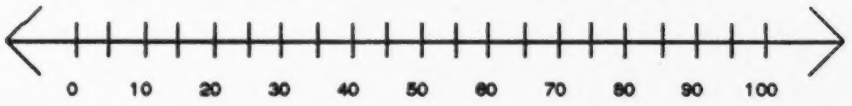
Check students' understanding by showing them numbers on the chalkboard and having them round either to the nearest ten, hundred, or thousand. Students should write their

answers on 3 x 5 cards or individual chalkboards and display them so that a quick assessment can be made.

Materials

Introduction:

1. A number line drawn on the chalkboard as shown below:



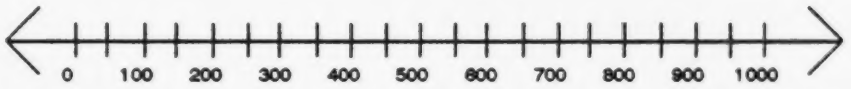
Day 1:

1. 3 x 5 cards showing two-, three- four-, and five-digit numbers to be rounded to the nearest ten for each pair of students (Answers should be written on the backs of cards.)

2. Same as Materials #1 Day 1 but different two-, three-, four-, and five digit numbers should be used

Day 2:

1. A number line drawn on the chalkboard as shown below

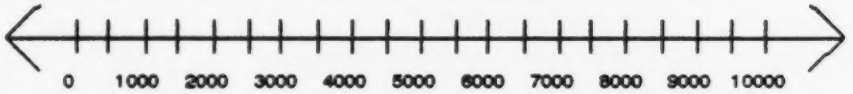


2. Same as Materials #1 Day 1 but only three-, four-, and five-digit numbers should be used

3. Same as Materials #2 Day 2 but different three-, four-, and five-digit numbers should be used

Day 3:

1. A number line drawn on the chalkboard as shown below



2. Same as Materials #1 Day 1 but only four- and five-digit numbers should be used

3. Same as Materials #2 Day 3 but different four- and five-digit numbers should be used

Culmination:

1. 3 x 5 cards or individual chalkboards and chalk for each student

Sample Tests

Test 1

Directions: Round each number as directed. Mark your choice on the answer sheet.

1. Round 852 to the nearest ten.

   (a) 800
   (b) 850
   (c) 860
   (d) 900

2. Round 1,978 to the nearest thousand.

   (a) 1980
   (b) 1900
   (c) 1970
   (d) 2000

3. Round 29 to the nearest ten.

   (a) 30
   (b) 20
   (c) 40
   (d) 10

4. Round 592 to the nearest hundred.

   (a) 500
   (b) 600
   (c) 590
   (d) 610

5. Round 377 to the nearest ten.

   (a) 370
   (b) 400
   (c) 380
   (d) 300

6. Round 12,456 to the nearest thousand.

   (a) 12,000
   (b) 13,000
   (c) 12,500
   (d) 12,400

7. Round 86,154 to the nearest hundred.

   (a) 86,150
   (b) 86,000
   (c) 87,000
   (d) 86,200

8. Round 5,671 to the nearest hundred.

   (a) 5,600
   (b) 5,700
   (c) 5,000
   (d) 6,000

9. Round 3,349 to the nearest ten.

   (a) 3,300
   (b) 3,000
   (c) 3,350
   (d) 3,340

10. Round 44,912 to the nearest ten.

    (a) 44,900
    (b) 45,000
    (c) 44,920
    (d) 44,910

Sample Tests

Test 2

Directions: Round each number as directed. Mark your choice on the answer sheet.

1. Round 51 to the nearest ten.

   (a) 50
   (b) 60
   (c) 70
   (d) 40

2. Round 2,234 to the nearest thousand.

   (a) 3,000
   (b) 2,200
   (c) 2,000
   (d) 2,230

3. Round 865 to the nearest ten.

   (a) 800
   (b) 870
   (c) 900
   (d) 850

4. Round 774 to the nearest hundred.

   (a) 700
   (b) 800
   (c) 770
   (d) 780

5. Round 15,706 to the nearest thousand.

   (a) 15,000
   (b) 15,700
   (c) 15,800
   (d) 16,000

6. Round 4,938 to the nearest ten.

   (a) 4,940
   (b) 4,930
   (c) 4,900
   (d) 5,000

7. Round 63,481 to the nearest hundred.

   (a) 63,400
   (b) 63,500
   (c) 63,000
   (d) 63,480

8. Round 1,872 to the nearest hundred.

   (a) 1,900
   (b) 1,800
   (c) 1,870
   (d) 1,970

9. Round 328 to the nearest hundred.

   (a) 400
   (b) 320
   (c) 330
   (d) 300

10. Round 17,539 to the nearest ten.

    (a) 17,500
    (b) 17,540
    (c) 18,000
    (d) 17,530

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.3

Change improper fractions to mixed numerals.

Explanation of Objective

Change improper fractions with numerators no greater than 19 and denominators less than 10 to mixed numerals.

Prerequisite Skills (descending order)

(a) **Master TM 5.4 (i.e. Simplify proper fractions.).**
(b) Find the greatest common factor when given two numbers.
(c) Identify equivalent fractions.
(d) Divide a two-digit number by a one-digit number with and without remainders.
(e) **Master TM 3.5 (i.e., Identify fractional parts from halves through fifths.).**

Vocabulary

fractions
proper fraction
improper fraction
mixed numerals

Lesson Plan Outline

Introduction:

Show the students two apples. Say, "Here are two whole apples. Now, I will cut the apples into halves." After cutting, show the halves and ask how many halves there are. Ask a student to write the fraction for four halves on the chalkboard. Now, form two whole apples from the four halves by placing two halves together in each hand. Ask how many wholes do $^4/_2$ equal. Write $^4/_2 = 2$ on the chalkboard. Next, show three halves of the apple and ask a student to write the fraction for three halves on the board. Place two of the halves together in one hand and hold the third half in the other hand. Ask students to tell another way to express the number of apples you are holding. If students have difficulty, write $^3/_2 = ?$ on the board and ask how many wholes do $^3/_2$ equal. If students still have difficulty, guide them to see that you are holding $1^1/_2$ apples. Write $^3/_2 = 1^1/_2$ on the board. Further students' understanding by using other objects such as sheets of paper, oranges, and paper plates to demonstrate how an improper fraction can be changed to a mixed number. Point to each improper fraction that has been used for demonstration and say that all of these fractions are greater than one. Also say that fractions greater than one are

called improper fractions. Ask students if they can tell what the fractions they have studied in previous lessons, the fractions not greater than one, might be called. Stress the difference between proper and improper fractions. Point to the equation, $^3/_2 = 1^1/_2$, written on the board earlier. Say that expressing $^3/_2$ as $1^1/_2$ means to write an improper fraction as a mixed number with $^3/_2$ being the improper fraction and $1^1/_2$ being the mixed number. Ask students why $1^1/_2$ is called a mixed number.

Activities:

Day 1:

1. Give pairs of students ten sets of directions to follow, scissors, and paper circles, squares, triangles, and rectangles of various sizes. Have students use the materials to follow directions which require students to write improper fractions as mixed numbers. Examples of directions that may be given are as follows:

   (a) Cut two circles into thirds. Use five thirds to help you complete the equation, $^5/_3 =$ _____.

   (b) Cut three rectangles into thirds. Use eight thirds to help you complete the equation, $^8/_3 =$ _____.

2. After students have completed Activity #1 Day 1, have different pairs of students share the steps they used to complete the equations.

Day 2:

1. Write $^5/_4$ on the chalkboard. Say that there is a simpler way to change an improper fraction to a mixed number by dividing. Divide the denominator into the numerator. For example:

$$\begin{array}{r} 1 \\ 4\overline{)\,5} \\ \underline{-\,4} \\ 1 \end{array} \qquad {}^5/_4 = 1^1/_4$$

Provide several additional examples to increase students' understanding.

2. Have pairs of students play a game where students take turns drawing a card, determining if the fraction is proper or improper, and if improper, changing the fraction to a mixed number (Answers should be written on the backs of cards.). If the student gives the correct answer, he/she may keep the card. When all cards have been used, the game ends and the student with the most cards wins. Allow students to use scissors and paper circles, squares, triangles, and rectangles for assistance.

3. Have pairs of students work together where one student thinks of an improper fraction and the other student changes it to a mixed number. Each student should think of at least five improper fractions for the other student to change.

Culmination:

Check students' understanding by displaying improper fractions for students to change to mixed numbers, write on blank 3 x 5 cards and display.

Materials

Introduction:

1. Two apples and a knife with which to cut them into halves

2. Other objects such as sheets of paper, oranges, and paper plates to demonstrate how an improper fraction can be changed to a mixed number

Day 1:

1. Ten sets of directions for each pair of students to follow to change improper fractions to mixed numbers such as:

   Cut two circles into fifths. Use nine fifths to help you complete the equation, $^{9}/_{5} =$ _____.

2. Scissors for each pair of students

3. Paper circles, triangles, squares, and rectangles of various sizes for each pair of students

Day 2:

1. Cards showing proper and improper fractions for each pair of students. On the backs of cards write whether the fraction is proper or improper and if improper, the mixed number for the fraction

2. Scissors for each pair of students

3. Paper circles, triangles, squares, and rectangles for each pair of students

4. Blank paper for each pair of students

Culmination:

1. Improper fractions written on cards to display

2. Blank 3 x 5 cards for each student

Sample Tests

Test 1

Directions: Change the improper fraction to a mixed numeral. Mark your choice on the answer sheet.

1. $\frac{8}{3}$

(a) $\frac{3}{8}$
(b) $2\frac{2}{3}$
(c) $\frac{2}{3}$
(d) $3\frac{1}{8}$

2. $\frac{18}{5}$

(a) $3\frac{3}{5}$
(b) $\frac{5}{18}$
(c) $5\frac{1}{18}$
(d) $\frac{3}{5}$

3. $\frac{16}{7}$

(a) $\frac{2}{7}$
(b) $7\frac{1}{16}$
(c) $2\frac{2}{7}$
(d) $\frac{7}{16}$

4. $\frac{9}{2}$

(a) $4\frac{1}{2}$
(b) $\frac{2}{9}$
(c) $\frac{1}{2}$
(d) $2\frac{1}{2}$

5. $\frac{11}{4}$

(a) $\frac{3}{4}$
(b) $\frac{4}{11}$
(c) $4\frac{1}{11}$
(d) $2\frac{3}{4}$

6. $\frac{7}{4}$

(a) $\frac{3}{4}$
(b) $\frac{4}{7}$
(c) $1\frac{3}{4}$
(d) $1\frac{1}{4}$

7. $\frac{19}{6}$

(a) $6\frac{1}{19}$
(b) $3\frac{1}{6}$
(c) $\frac{1}{6}$
(d) $\frac{6}{19}$

8. $\frac{3}{2}$

(a) $\frac{2}{3}$
(b) $1\frac{1}{2}$
(c) $\frac{1}{2}$
(d) $2\frac{1}{3}$

9. $\frac{13}{5}$

(a) $\frac{5}{13}$
(b) $\frac{3}{5}$
(c) $5\frac{1}{13}$
(d) $2\frac{3}{5}$

10. $\frac{17}{3}$

(a) $5\frac{2}{3}$
(b) $\frac{3}{17}$
(c) $3\frac{1}{17}$
(d) $\frac{2}{3}$

Sample Tests

Test 2

Directions: Change the improper fraction to a mixed numeral. Mark your choice on the answer sheet.

1. $\frac{12}{7}$

(a) $\frac{7}{12}$
(b) $7\frac{1}{12}$
(c) $1\frac{5}{7}$
(d) $\frac{5}{7}$

2. $\frac{17}{8}$

(a) $\frac{1}{8}$
(b) $8\frac{1}{17}$
(c) $\frac{8}{17}$
(d) $2\frac{1}{8}$

3. $\frac{7}{2}$

(a) $3\frac{1}{2}$
(b) $2\frac{1}{7}$
(c) $\frac{2}{7}$
(d) $\frac{1}{7}$

4. $\frac{11}{9}$

(a) $1\frac{2}{9}$
(b) $\frac{9}{11}$
(c) $\frac{2}{9}$
(d) $9\frac{1}{11}$

5. $\frac{13}{6}$

(a) $\frac{6}{13}$
(b) $2\frac{1}{6}$
(c) $\frac{1}{6}$
(d) $6\frac{1}{13}$

6. $\frac{5}{3}$

(a) $\frac{2}{3}$
(b) $\frac{3}{5}$
(c) $3\frac{1}{5}$
(d) $1\frac{2}{3}$

7. $\frac{9}{4}$

(a) $\frac{4}{9}$
(b) $\frac{1}{4}$
(c) $2\frac{1}{4}$
(d) $4\frac{1}{9}$

8. $\frac{6}{5}$

(a) $1\frac{1}{5}$
(b) $5\frac{1}{6}$
(c) $\frac{5}{6}$
(d) $\frac{1}{6}$

9. $\frac{10}{3}$

(a) $\frac{3}{10}$
(b) $3\frac{1}{3}$
(c) $\frac{1}{3}$
(d) $3\frac{1}{10}$

10. $\frac{5}{2}$

(a) $\frac{2}{5}$
(b) $\frac{1}{2}$
(c) $2\frac{1}{5}$
(d) $2\frac{1}{2}$

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.4

Simplify proper fractions.

Explanation of Objective

Simplify proper fractions where the denominator is less than 21 and the divisor used for simplifying is less than 10.

Prerequisite Skills (descending order)

(a) Identify fractions in simplest form.
(b) Find the greatest common factor when given two numbers.
(c) Identify equivalent fractions.
(d) Divide a two-digit number by a one-digit number with and without remainders (For a listing of skills prerequisite to these skills, refer to TM 3.5).

Vocabulary

fraction
proper fraction
simplify
simplest form
factor
greatest common factor

Lesson Plan Outline

Introduction:

Write the numbers 4 and 6 on the chalkboard. Ask students to list all the numbers that will divide evenly into 4 and then list all the numbers that will divide evenly into 6. If students have trouble beginning, ask the following questions:

Will 1 divide evenly into 4?
Will 2 divide evenly into 4?
Will 3 divide evenly into 4?
Etc.

Ask the same type of questions for 6. Additionally, represent 4 and 6 with unifix cubes. For example, use 4 white unifix cubes and 6 blue unifix cubes. Separate them into groups of 1 each, 2 each, etc. to illustrate the numbers that will divide evenly into them. Draw

corresponding squares on the chalkboard to deepen students' understanding. After listing these numbers, the board should look as follows:

4 : 1, 2, 4
6 : 1, 2, 3, 6

(Note: The numbers may be listed out of order when the students list them. Place them in order from the smallest to the largest on the board.) Tell the students that the numbers they have listed are factors of 4 and factors of 6. Have students identify the largest factor by which both 4 and 6 are divisible. Underline this factor for each number on the board. For example:

Factors of 4 : 1, 2, 4
Factors of 6 : 1, 2, 3, 6

Tell students that 2 is the greatest common factor of 4 and 6. If the term, greatest common factor, is new to students, further explanation may need to be given. Use other pairs of numbers as examples for identifying the greatest common factor.

Activities:

Day 1:

1. Have pairs of students take turns with each student rolling three die, adding the three numbers that were rolled, and finding the factors of the sum of the three numbers. Allow students to use unifix cubes, paper, and pencils for assistance. After students have had one turn each, they should compare the factors for their two numbers and find the greatest common factor. Students should continue in this manner until time is called. Give the students ten minutes to find as many greatest common factors as possible. The pair finding the most after ten minutes wins.

2. After students have completed Activity #1 Day 1, have some of the pairs come to the board and illustrate how they found the greatest common factor for two of their numbers. Let as many pairs as possible do this as time permits.

Day 2:

1. Write the numbers, 10 and 12, on the chalkboard. Use unifix cubes to represent these numbers. Have students name the factors. Illustrate dividing these numbers by the factors named with unifix cubes. Point out that 1 and 2 are common factors. Say that if we use 10 and 12 to make the fraction $^{10}/_{12}$, the common factors (i.e., 1 and 2) are the same for the numerator and the denominators as for the whole numbers. The common factor for the fraction $^{5}/_{6}$ is 1. Illustrate with unifix cubes that 5 and 6 can both be divided evenly by 1 only. Therefore $^{5}/_{6}$ is in its simplest form. Explain that when the numerator and denominator have more than one common factor, namely any number other than 1, they are not in simplest form. In other words, a faction is in simplest form when 1 is the only common factor of the numerator and the denominator. Provide other

examples of fractions that are in simplest form and fractions that are not in simplest form.

2. Divide the class into two teams. Give each member a 3 x 5 card with a fraction on it (Refer to Explanation of Objective for criteria for the construction of fractions.). Some of the fractions should be in simplest form. Each team member should examine his/her card to determine whether his/her fraction is in simplest form. If the fraction is in simplest form, then the team member should come to his/her team's designated area in the front of the room and write the fraction on the board. The first team to write all of its fractions that are in simplest form on the board wins. Allow students to use unifix cubes, paper, and pencils for assistance.

3. Have pairs of students play a game where each student is given a stack of ten 3 x 5 cards with fractions that are in simplest forms and fractions that are not in simplest form written on them. Give students 10 minutes to identify as many fractions in simplest form from their stacks as they can. The student identifying the most when time is called is the winner. Then, have some of the students write fractions from their cards on the chalkboard and tell how they decided whether the fractions were in simplest form or not. Allow students to use unifix cubes, paper, and pencils for assistance.

Day 3:

1. Tell the students that now that they have practiced finding the greatest common factor of two numbers and identifying whether a fraction is in simplest form or not, they will learn how to change a fraction not in simplest form to one that is in simplest form. Write $^{12}/_{16}$ on the chalkboard. Have students identify the factors for the numerator and denominator and then identify their greatest common factor. Say that to simplify or reduce a fraction, or put it in simplest form, both the numerator and denominator must be divided by the greatest common factor. Illustrate on the board as follows:

Fraction	GCF	Divide	Simplest Form
$\frac{12}{16}$	4	$\frac{12 \div 4 = 3}{16 \div 4 = 4}$	$\frac{3}{4}$

Also illustrate dividing 12 and 16 unifix cubes by 4 to get $^{3}/_{4}$. Emphasize that $^{12}/_{16}$ and $^{3}/_{4}$ are equivalent fractions. Demonstrate simplifying several other fractions emphasizing the equivalent fractions in each case (Refer to Explanation of Objective for criteria for the construction of fractions.).

2. Have pairs of students play Concentration. Cards to be matched should include cards with proper fractions that need simplifying and cards showing the same fractions, but in simplest form. For example, a match would be as follows:

$\frac{4}{8}$	matches	$\frac{1}{2}$

The student from each pair having the most matches at the end of the game wins. Allow students to use unifix cubes, paper, and pencils for assistance.

3. Have pairs of students play Concentration as in Activity #2 Day 3 but with no student being paired with the same partner as in the previous activity. Additionally, cards showing fractions different from those in the previous activity should be used.

Culmination:

Check students' understanding by showing them fractions with some in simplest form and some not in simplest form. If a fraction is in simplest form, students are to do nothing. If it is not in simplest form, students are to simplify it, write the simplified form on a 3 x 5 card, and show it.

Materials

Note: Refer to Explanation of Objective for criteria for the construction of fractions.

Introduction:

1. Pairs of numbers to be used for demonstrating finding the greatest common factor

2. Unifix cubes

Day 1:

1. Three die for each pair of students

2. Paper and pencil for each student

3. Unifix cubes for each pair of students

Day 2:

1. Fractions that are in simplest form and fractions that are not in simplest form to be used as illustrations

2. A 3 x 5 card for each member of two teams with either a fraction in simplest form or a fraction not in simplest form

3. Unifix cubes, paper, and pencil for each student

4. A stack of ten 3 x 5 cards with some showing fractions in simplest form and some showing fractions not in simplest form for each student

Day 3:

1. Fractions not in simplest form to use for demonstrating simplifying fractions

2. Cards to play Concentration where a match consists of one card showing a fraction in simplest form and the other showing the same fraction not in simplest form

Example:

$\frac{3}{12}$	matches	$\frac{1}{4}$

3. Cards to play Concentration as in Materials #2 Day 3 but showing fractions different from those used in the first game of Concentration

4. Unifix cubes, paper, and pencils for each pair of students

Culmination:

1. Fractions in simplest form and fractions not in simplest form on 3 x 5 cards to show students

2. Unifix cubes, paper, and pencil for each student

3. Blank 3 x 5 cards for each student

Sample Tests

Test 1

Directions: Reduce the fraction to its simplest form. Mark your choice on the answer sheet.

1. $\frac{10}{20}$

(a) $\frac{1}{20}$
(b) $\frac{1}{2}$
(c) $\frac{2}{5}$
(d) $\frac{1}{4}$

2. $\frac{6}{18}$

(a) $\frac{1}{3}$
(b) $\frac{1}{18}$
(c) $\frac{2}{3}$
(d) $\frac{1}{9}$

3. $\frac{8}{14}$

(a) $\frac{4}{7}$
(b) $\frac{2}{7}$
(c) $\frac{1}{2}$
(d) $\frac{1}{14}$

4. $\frac{4}{10}$

(a) $\frac{4}{5}$
(b) $\frac{1}{2}$
(c) $\frac{2}{5}$
(d) $\frac{1}{10}$

5. $\frac{3}{6}$

(a) $\frac{1}{6}$
(b) $\frac{1}{3}$
(c) $\frac{3}{4}$
(d) $\frac{1}{2}$

6. $\frac{10}{12}$

(a) $\frac{2}{3}$
(b) $\frac{3}{4}$
(c) $\frac{5}{12}$
(d) $\frac{5}{6}$

7. $\frac{8}{16}$

(a) $\frac{1}{2}$
(b) $\frac{1}{8}$
(c) $\frac{3}{8}$
(d) $\frac{1}{4}$

8. $\frac{2}{4}$

(a) $\frac{1}{4}$
(b) $\frac{2}{3}$
(c) $\frac{1}{8}$
(d) $\frac{1}{2}$

9. $\frac{4}{8}$

(a) $\frac{1}{2}$
(b) $\frac{1}{4}$
(c) $\frac{1}{8}$
(d) $\frac{2}{3}$

10. $\frac{6}{10}$

(a) $\frac{2}{5}$
(b) $\frac{3}{5}$
(c) $\frac{1}{2}$
(d) $\frac{3}{10}$

Sample Tests

Test 2

Directions: Reduce the fraction to its simplest form. Mark your choice on the answer sheet.

1. $\frac{4}{20}$

(a) $\frac{1}{4}$
(b) $\frac{2}{5}$
(c) $\frac{1}{5}$
(d) $\frac{1}{10}$

2. $\frac{8}{18}$

(a) $\frac{4}{9}$
(b) $\frac{1}{3}$
(c) $\frac{2}{3}$
(d) $\frac{2}{9}$

3. $\frac{7}{14}$

(a) $\frac{1}{2}$
(b) $\frac{1}{14}$
(c) $\frac{1}{7}$
(d) $\frac{2}{7}$

4. $\frac{8}{10}$

(a) $\frac{4}{5}$
(b) $\frac{2}{5}$
(c) $\frac{1}{10}$
(d) $\frac{1}{5}$

5. $\frac{2}{6}$

(a) $\frac{1}{2}$
(b) $\frac{1}{3}$
(c) $\frac{1}{6}$
(d) $\frac{2}{3}$

6. $\frac{3}{12}$

(a) $\frac{3}{4}$
(b) $\frac{1}{12}$
(c) $\frac{1}{4}$
(d) $\frac{1}{3}$

7. $\frac{2}{16}$

(a) $\frac{1}{8}$
(b) $\frac{1}{4}$
(c) $\frac{1}{2}$
(d) $\frac{1}{10}$

8. $\frac{6}{20}$

(a) $\frac{1}{20}$
(b) $\frac{3}{5}$
(c) $\frac{2}{5}$
(d) $\frac{3}{10}$

9. $\frac{2}{8}$

(a) $\frac{1}{8}$
(b) $\frac{1}{4}$
(c) $\frac{1}{2}$
(d) $\frac{2}{9}$

10. $\frac{5}{10}$

(a) $\frac{1}{10}$
(b) $\frac{1}{5}$
(c) $\frac{1}{2}$
(d) $\frac{2}{3}$

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.5

Add up to four 5-digit whole numbers, regrouping as necessary.

Explanation of Objective

Add up to four 3-, 4-, or 5-digit whole numbers in vertical form, regrouping as necessary.

Prerequisite Skills (descending order)

(a) Add two four-digit whole numbers with and without regrouping.
(b) Add two or three three-digit whole numbers with and without regrouping.
(c) **Master Objective 3.6 (i.e., Add through 3-digit whole numbers, regrouping as necessary.).**

Vocabulary

add
addition
addend
sum

Lesson Plan Outline

Introduction:

Review skills mastered in Objective 3.6 (i.e., Add through 3-digit whole numbers, regrouping as necessary.). Write the following exercises on the board for review:

448	327	119
+ 49	+ 192	625
		+243

Have a student use the red, blue, and green popsicle sticks from TM 3.1 which represent ones, tens, and hundreds, respectively, and demonstrate the adding of these exercises. At the same time, these students should show their work on the board and write the sums under the exercises. Then, write the following on the board:

532
643
149
+ 221

Give each student a place-value chart showing the ones, tens, hundreds, thousands, and ten-thousands place. The chart should be large enough to allow popsicle sticks to be placed in each column. For example:

ten-thousands	thousands	hundreds	tens	ones

Additionally, give each student red, blue, green, and orange popsicle sticks from TM 3.1. Now have the students show 532 with the sticks on the chart (i.e., place 2 red sticks in the ones column, 3 blue sticks in the tens column, and 5 green sticks in the hundreds column). Have them show 643; 149; and 221 on the chart also, but in rows under 532. The charts should look as follows:

ten-thousands	thousands	hundreds	tens	ones
		green green green green green green green green green green green green green green green	blue blue blue blue blue blue blue blue blue blue blue blue blue blue	red red red red red red red red red red red red red red

Now, have students add the ones column. The answer is 15. Ask students if regrouping is needed. Write a 5 under the ones column in the exercise on the board. Show how the tens ones or ten red sticks can be traded for 1 ten or 1 blue stick and placed in the tens

column on the chart. Also show how a "1" can be placed above the hundreds column in the exercise on the board. Now the board should look as follows:

$$\begin{array}{r} {\scriptstyle 1} \\ 532 \\ 643 \\ 149 \\ +\ 221 \\ \hline 5 \end{array}$$

The chart should look as follows:

ten-thousands	thousands	hundreds	tens	ones
		green	blue	red
		green	blue	red
		green	blue	red
		green		red
		green		red
		green	blue	
		green	blue	
		green	blue	
		green	blue	
		green		
		green		
		green	blue	
			blue	
			blue	
			blue	
		green	blue	
		green	blue	
			blue	
			↑	
			the additional ten from the ones column	

Now, have students add the tens column. The answer is 14 (i.e. 140). Ask students if regrouping is needed. Write a 4 under the tens column in the exercise on the board. Show students how the ten tens or ten blue sticks can be traded for one hundred or one green stick and placed in the hundreds column on the chart. Also show how a "1" can be placed above the tens column in the exercise on the board. Now the board should look as follows:

$$\begin{array}{r} {\scriptstyle 1\,1} \\ 532 \\ 643 \\ 149 \\ +\,221 \\ \hline 45 \end{array}$$

The chart should look as follows:

ten-thousands	thousands	hundreds	tens	ones
		green green green green green green green green green green green green green green The additional hundred from the tens column	blue blue blue blue	red red red red red

Now, have students add the hundreds column. The answer is 15 (i.e., 1500). Ask students if regrouping is needed. Write a 5 under the hundreds column in the exercise on the board. Show students how the ten hundreds or ten green sticks can be traded for one thousand or one orange stick and placed in the thousands column on the chart. Also show how a "1" can be placed above the thousands column in the exercise on the board. Now, the board should look as follows:

$$\begin{array}{r} {\scriptstyle 1\,1\,1} \\ 532 \\ 643 \\ 149 \\ +\,221 \\ \hline 545 \end{array}$$

The chart should look as follows:

ten-thousands	thousands	hundreds	tens	ones
	orange ↑ the thousand from the hundreds column	green green green green green	blue blue blue blue	red red red red red

Next, have students add the thousands column. Ask if regrouping is needed. Write a 1 under the thousands column in the exercise on the board. The board should look as follows:

```
 1 1 1
  532
  643
  149
+ 221
 1545
```

Ask a student to read the answer. Then, demonstrate other similar exercises following the same procedure as was described above.

Activities:

Day 1:

1. Given ten exercises involving the addition of four three-digit numbers with regrouping, students should work in pairs using red, blue, and green popsicle sticks to find the answers. Students should take turns working each exercise with one student arranging the sticks in a manner to find the answer and the other student drawing a pictorial illustration of the popsicle sticks on paper. Also, they should take turns finding and explaining the answers. Optional: Have students verify each answer through the use of a calculator. If the calculator answer is different, then students should go back and re-work the exercise (Note: Students must be proficient in using a calculator in order to employ it in this manner.).

2. After students have worked all of the exercises in Activity #1 Day 1, have some of the pairs of students show on the chalkboard what they did and explain why they did it. Have them illustrate with the popsicle sticks, too.

Day 2:

1. Extend the introduction activity to demonstrate the addition of four four-digit numbers with regrouping.

2. Adapt Activity #1 Day 1 to include the addition of four four-digit numbers with

regrouping. Use red, blue, green, and orange popsicle sticks. Use white popsicle sticks to represent the ten-thousands place, if necessary.

3. Follow the same procedure as was followed in Activity #2 Day 1, but adapt it to to correspond with Activity #2 Day 2.

Day 3:

1. Extend the introduction activity to demonstrate the addition of four five-digit numbers with regrouping.

2. Adapt Activity #1 Day 1 to include the addition of four five-digit numbers with regrouping. Use red, blue green, and orange popsicle sticks. If necessary, use white popsicle sticks to represent the ten-thousands place.

3. Follow the same procedure as was followed in Activity #2 Day 1, but adapt it to correspond with Activity #2 Day 3.

Day 4:

1. Have pairs of students play a version of Tic Tac Toe. The first student to play should draw a card from a deck of four three-, four-, and five-digit addition exercises with regrouping. Then, the student should find the answer to the exercise using the red, blue, green, orange, and white popsicle sticks, if necessary, and blank paper. The answer should be verified with the correct answer written on the back of the card or with a calculator. If it is correct, the student gets to place an X or O on the Tic Tac Toe board. Then, the other student's turn begins. The game continues until one student has three X's or O's in a row and wins. Repeat the game two or three times, but with different students working together.

Culmination:

Check students' understanding of adding up to four five-digit numbers by showing students five exercises, one at a time, that have been written on 3 x 5 cards. After each exercise is shown, have students work the exercises on paper, write the answers on blank 3 x 5 cards, and display them.

Materials

Introduction:

1. Red, blue, green, and orange popsicle sticks for each student

2. A place-value chart for each student

Day1:

1. Ten exercises involving the addition of four three-digit numbers with regrouping
2. Red, blue, green, and orange popsicle sticks for each pair of students
3. Blank paper for each student
4. Calculator for each pair of students (optional)

Day 2:

1. Red, blue, green, orange, and white popsicle sticks for each student
2. A place-value chart for each student
3. Ten exercises involving the addition of four four-digit numbers with regrouping
4. Blank paper for each student
5. Calculator for each pair of students (optional)

Day 3:

1. Red, blue, green, orange, and white popsicle sticks for each student
2. A place-value chart for each student
3. Ten exercises involving the addition of four five-digit numbers with regrouping
4. Blank paper for each student
5. Calculator for each pair of students (optional)

Day 4:

1. A deck of cards showing four three-, four-, and five-digit addition exercises with regrouping
2. Red, blue, green, orange, and white popsicle sticks for each student
3. Blank paper for each student
4. Calculator for each pair of students
5. Tic Tac Toe boards which have been duplicated onto paper

Culmination:

1. Five addition exercises up to four five-digit numbers written on 3 x 5 cards
2. Blank paper for each student
3. Blank 3 x 5 cards for each student

Sample Tests

Test 1

Directions: Add. Mark your choice on the answer sheet.

1.
```
  542
1,309
4,561
+ 120
```
(a) 5,532
(b) 5,512
(c) 6,632
(d) 6,532

2.
```
  823
  723
5,566
+10,904
```
(a) 18,016
(b) 17,016
(c) 15,006
(d) 18,116

3.
```
 42,365
+39,008
```
(a) 71,363
(b) 81,373
(c) 81,363
(d) 71,373

4.
```
  367
  607
 +771
```
(a) 1,635
(b) 1,735
(c) 1,745
(d) 1,645

5.
```
 5,109
 9,234
 6,782
+2,026
```
(a) 23,151
(b) 23,141
(c) 22,161
(d) 22,131

6.
```
 98,100
  1,652
+  337
```
(a) 99,089
(b) 100,089
(c) 100,025
(d) 99,989

7.
```
 85,005
 17,176
 62,331
+44,455
```
(a) 198,857
(b) 199,857
(c) 208,967
(d) 209,907

8.
```
  448
+1,407
```
(a) 1,841
(b) 1,855
(c) 1,851
(d) 1,041

9.
```
 2,237
+3,756
```
(a) 5,003
(b) 5,993
(c) 5,903
(d) 6,003

10.
```
 16,449
 37,034
+46,118
```
(a) 99,601
(b) 99,591
(c) 98,601
(d) 98,591

Sample Tests

Test 2

Directions: Add. Mark your choice on the answer sheet.

1.
166
4,221
9,606
+ 380

(a) 14,263
(b) 14,373
(c) 15,373
(d) 13,363

2.
778
492
1,334
+15,573

(a) 16,967
(b) 16,177
(c) 17,867
(d) 18,177

3.
56,242
+19,769

(a) 76,011
(b) 65,901
(c) 66,001
(d) 67,101

4.
889
129
+741

(a) 1,649
(b) 1,659
(c) 1,759
(d) 1,749

5.
3,492
4,503
5,614
+6,723

(a) 21,432
(b) 20,332
(c) 18,222
(d) 20,223

6.
67,353
2,763
+ 448

(a) 69,454
(b) 69,464
(c) 70,564
(d) 70,464

7.
96,116
28,287
73,442
+55,566

(a) 21,291
(b) 212,291
(c) 252,391
(d) 253,411

8.
559
+2,518

(a) 3,077
(b) 3,167
(c) 2,067
(d) 2,167

9.
3,348
+4,896

(a) 8,134
(b) 8,244
(c) 7,144
(d) 7,234

10.
27,550
48,145
+57,229

(a) 132,924
(b) 122,814
(c) 112,825
(d) 11,284

Objective 5.6

Subtract through 5-digit whole numbers, regrouping as necessary.

Explanation of Objective

Subtract 3-, 4-, and 5-digit whole numbers in vertical form, with and without regrouping.

Prerequisite Skills (descending order)

(a) Subtract four-digit numbers with and without regrouping.
(b) **Master Objective 3.7 (i.e., Subtract through 3-digit whole numbers, regrouping as necessary.).**

Vocabulary

subtract
subtraction
minus
minuend
subtrahend
difference

Lesson Plan Outline

Introduction:

Review skills mastered in Objective 3.7 (i.e., Subtract through 3-digit whole numbers, regrouping as necessary.). Write the following exercises on the board for review:

448	627	549
- 129	- 236	- 463

Have a student use the red, blue, and green popsicle sticks from TM 3.1 which represent ones, tens, and hundreds, respectively, and demonstrate the adding of these exercises. At the same time, these students should show their work on the board and write the differences under the exercises. Then, write the following on the board:

9,326
- 4,687

Give each student place-value charts from TM 5.5 showing the ones, tens, hundreds, and

thousands places. Additionally, give each student red, blue, green, and orange popsicle sticks from TM 3.1. Have the students show 9,326 with the sticks on the chart (i.e., place 6 red sticks in the ones column, 2 blue sticks in the tens column, 3 green sticks in the hundreds column, and 9 orange sticks in the thousands column. The chart should look as follows:

thousands	hundreds	tens	ones
orange	green	blue	red
orange	green	blue	red
orange	green		red
orange			red
orange			red
orange			red
orange			red
orange			
orange			

Say, "You have 9,326. You must subtract or remove 4,687. What must be done in order to subtract in the ones column?" Demonstrate the exchange of one blue stick or one ten for ten red sticks or ten ones and have students do the same. Also show the regrouping of the ones column on the board. The chart should look as follows:

thousands	hundreds	tens	ones
orange	green	blue	red
orange	green		red
orange	green		red
orange			red
orange			red
orange			red
orange			red
orange			red
orange			red
			red
			red
			red
			red
			red
			red
			red
			red
			red
			red

The board should look as follows

$$\begin{array}{r} {\scriptstyle 1\,1\,16} \\ 9{,}3\not{2}\not{6} \\ -\ 4{,}687 \\ \hline \end{array}$$

Now that 16 sticks are in the ones column, 7 sticks must be subtracted. Show the subtraction of the ones column on the chart and on the board. The chart should look as follows:

thousands	hundreds	tens	ones
orange	green	blue	red
orange	green		red
orange	green		red
orange			red
orange			red
orange			red
orange			red
orange			red
orange			red
orange			red

The board should look as follows:

$$\begin{array}{r} {\scriptstyle 1\ 16} \\ 9{,}326 \\ -\ 4{,}687 \\ \hline 9 \end{array}$$

Next, have students subtract the tens column. Ask students if regrouping is needed. Show students how one hundred or one green stick can be traded for ten tens or ten blue sticks and placed in the tens column on the charts. Also show the regrouping of the tens column on the board. The chart should look as follows:

thousands	hundreds	tens	ones
orange	green	blue	red
orange	green	blue	red
orange		blue	red
orange		blue	red
orange		blue	red
orange		blue	red
orange		blue	red
orange		blue	red
orange		blue	red
orange		blue	red
		blue	
		blue	

The board should look as follows:

$$\begin{array}{r} {\scriptstyle 2\ 11\ 16} \\ 9{,}\not{3}\not{2}6 \\ -\ 4{,}687 \\ \hline 9 \end{array}$$

Now that 11 sticks are in the tens column, 8 sticks must be subtracted. Show the subtraction of the tens column on the chart and on the board. The chart should look as follows:

thousands	hundreds	tens	ones
orange	green	blue	red
orange	green	blue	red
orange		blue	red
orange			red
orange			red
orange			red
orange			red
orange			red
orange			red

The board should look as follows:

$$\begin{array}{r} {\scriptstyle 2\,11\,16} \\ 9,\not{3}\not{2}6 \\ -\ 4,687 \\ \hline 39 \end{array}$$

Next, have students subtract the hundreds column. Ask students if regrouping is needed. Show students how one thousand or one orange stick can be traded for ten hundreds or ten green sticks and placed in the hundreds column on the chart. Also show the regrouping of the hundreds column on the board. The chart should look as follows:

thousands	hundreds	tens	ones
orange	green	blue	red
orange	green	blue	red
orange	green	blue	red
orange	green		red
orange	green		red
orange	green		red
orange	green		red
orange	green		red
orange	green		red
	green		

The board should look as follows:

$$\begin{array}{r} {\scriptstyle 8\,12\,11\,16} \\ 9,\not{3}\not{2}\not{6} \\ -\ 4,687 \\ \hline 39 \end{array}$$

Now that 12 sticks are in the hundreds column, 6 sticks must be subtracted. Show the subtraction of the hundreds column on the chart and on the board. The chart should look

as follows:

thousands	hundreds	tens	ones
orange	green	blue	red
orange	green	blue	red
orange	green	blue	red
orange	green		red
orange	green		red
orange	green		red
orange			red
orange			red
			red

The board should look as follows:

$$\begin{array}{r} {\scriptstyle 8\,12\,11\,16} \\ 9,\not{3}\not{2}\not{6} \\ -\ 4,687 \\ \hline 639 \end{array}$$

Next, have students subtract the thousands column. Ask students if regrouping is needed. Since regrouping is not needed, simply demonstrate the subtraction or removal of 4 sticks from the 8 sticks in the thousands column on the chart and on the board. The chart should look as follows:

thousands	hundreds	tens	ones
orange	green	blue	red
orange	green	blue	red
orange	green	blue	red
orange	green		red
	green		red
	green		red
			red
			red
			red

The board should look as follows:

$$\begin{array}{r} {\scriptstyle 8\,12\,11\,16} \\ 9,\not{3}\not{2}\not{6} \\ -\ 4,687 \\ \hline 4,639 \end{array}$$

Ask a student to read the answer. Then, demonstrate other similar exercises following the same procedure as was described above.

Activities:

Day 1:

1. Have pairs of students play a Claim the Square game. The game board should be a 4 x 4 grid. Students are to take turns drawing a card showing a subtraction exercise with regrouping where the minuend and subtrahend are four-digit numbers. The student that draws the card should work the exercise using blank paper and popsicle sticks, if necessary. Answers should be verified by having the correct answer written on the back of each card or by the use of a calculator. If the answer is correct, then the student may claim any square on the grid by placing a dried bean on the square (Note: The two sets of dried beans must be different colors.). When all of the squares have been claimed, the game ends. The winner is the student that has claimed the most squares.

2. Have pairs of students play a subtraction game using a deck of 100 cards with numerals 0 - 9 written on them (i.e., ten cards will have 0 written on them, ten cards will have 1 written on them, ten cards will have 2 written on them, etc.). The dealer must deal himself and the other player eight cards face down. Each player should turn the cards face up, form two four-digit numerals from the numerals on the eight cards, and subtract the lower number from the higher number. The player with the higher score wins the round and one point. Scores should be verified by students checking one another or by the use of a calculator. The first player to win three rounds or three points wins the game. Scores can be recorded on score pads such as those described in TM 3.6, Activity #2 Day 2.

Day 2:

1. Extend the introduction activity to demonstrate the working of five-digit subtraction exercises with regrouping where the minuends and subtrahends are five-digit numbers. Use red, blue, green, orange, and white popsicle sticks to represent the ones, tens, hundreds, thousand, and ten-thousands, respectively.

2. Play the Claim the Squares game described in Activity #2 Day 1 but use five-digit subtraction exercises with regrouping where the minuends and subtrahends are five-digit numbers.

3. Play the subtraction game from Activity #1 Day 2 but have the dealer deal himself and the other player ten cards each. Players should form two five-digit numerals and subtract the lower number from the higher number.

Culmination:

Check students' understanding by having each student work five subtraction exercises using four- and five-digit whole numbers with regrouping per exercise.

Materials

Introduction:

1. Red, blue, green, and orange popsicle sticks

2. A place-value chart for each student

Day 1:

1. A 4 x 4 grid for each pair of students

2. Cards showing four-digit subtraction exercises with regrouping and four-digit numbers (Optional: Answers may be written on backs of cards.) Example:

Front	Back (Optional)
4,923 - 1,665	3,258

3. Blank paper

4. Red, blue, green, and orange popsicle sticks

5. Two sets of dried beans that are different colors (e.g. one set could be brown pinto beans and the other set could be red kidney beans)

6. Calculator (optional)

7. A deck of 100 cards with numerals 0 - 9 written on them (i.e., ten cards will have 0 on them, ten cards will have 1 on them and six cards will have 2 on them, etc.)

8. Blank paper for each student

9. A score pad for each student from TM 3.6, Activity #2 Day 2
For example:

Name	Round	Score	Points

Day 2:

1. Red, blue, green, orange, and white popsicle sticks

2. A place value chart showing the ones, tens, hundreds, thousands, and ten-thousands columns for each student

3. A 4 x 4 grid for each student

4. Cards showing subtraction exercises with regrouping and five-digit numbers (Optional: Answers may be written on backs of cards.)
Example:

Front	Back (optional)
96,321 - 32,412	63,909

5. A deck of 100 cards with numerals 0 - 9 written on them (i.e., ten cards will have 0 on them, ten cards will have 1 on them, etc.)

6. Blank paper for each student

7. A score pad for each student from TM 3.6, Activity #2 Day 2

Culmination:

1. Five subtraction exercises with regrouping and four- and five-digit numbers for each student

Sample Tests

Test 1

Directions: Subtract. Mark your choice on the answer sheet.

1. 9,052
   -1,431

   (a) 8,621
   (b) 7,621
   (c) 7,683
   (d) 7,581

2. 491
   - 329

   (a) 162
   (b) 172
   (c) 178
   (d) 120

3. 27,103
   - 15,821

   (a) 12,782
   (b) 11,322
   (c) 11,282
   (d) 42,924

4. 6,440
   - 329

   (a) 6,111
   (b) 6,121
   (c) 6,129
   (d) 6,769

5. 15,226
   - 7,843

   (a) 7,063
   (b) 7,383
   (c) 7,396
   (d) 8,483

6. 23,807
   - 6,994

   (a) 30,721
   (b) 26,193
   (c) 17,913
   (d) 16,813

7. 529
   - 485

   (a) 1,014
   (b) 164
   (c) 144
   (d) 44

8. 3,377
   - 1,287

   (a) 2,090
   (b) 2,110
   (c) 2,590
   (d) 4,574

9. 96,253
   - 58,148

   (a) 38,395
   (b) 38,115
   (c) 38,105
   (d) 34,105

10. 46,643
    - 24,752

    (a) 22,891
    (b) 22,895
    (c) 21,891
    (d) 21,195

Sample Tests

Test 2

Directions: Subtract. Mark your choice on the answer sheet.

1. 6,490
   - 3,291

   (a) 3,291
   (b) 3,209
   (c) 3,191
   (d) 3,199

2. 575
   - 288

   (a) 287
   (b) 397
   (c) 283
   (d) 297

3. 46,927
   - 20,084

   (a) 16,943
   (b) 26,843
   (c) 26,863
   (d) 26,963

4. 4,778
   - 974

   (a) 3,204
   (b) 3,704
   (c) 3,804
   (d) 4,204

5. 37,066
   - 9155

   (a) 32,111
   (b) 28,911
   (c) 27,911
   (d) 37,911

6. 24,918
   - 7,009

   (a) 17,909
   (b) 17,911
   (c) 17,919
   (d) 23,911

7. 630
   - 596

   (a) 44
   (b) 34
   (c) 144
   (d) 134

8. 4,488
   - 2,398

   (a) 2,080
   (b) 2,090
   (c) 2,110
   (d) 2,190

9. 85,142
   - 47,037

   (a) 38,105
   (b) 38,115
   (c) 48,105
   (d) 48,115

10. 57,754
    -35,863

    (a) 22,991
    (b) 22,191
    (c) 22,111
    (d) 21,891

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.7

Multiply through 3-digit by 2-digit numbers, regrouping as necessary.

Explanation of Objective

Multiply through 3-digit by 2-digit whole numbers in vertical form, regrouping as necessary.

Prerequisite Skills

(a) Multiply two-digit numbers, regrouping as necessary.
(b) Indicate instant recall of basic facts through 9 x 9.
(c) **Master Objective 3.8 (i.e., Multiply using basic facts through 5 x 9.).**

Vocabulary

multiply
multiplication
times
multiplicand
multiplier

Lesson Plan Outline

Introduction:

Write the following exercise on the board:

tens	ones
1	8
x 2	4

Then, write the exercise in expanded form so that students can see the actual step-by-step process of multiplying two two-digit numbers. Write the following on the board next to the exercise already on the board:

$$18 \times 24 = (8 \times 4) + (10 \times 4) + (20 \times 8) + (20 \times 10)$$

$$= 32 + 40 + 160 + 200$$

$$= 432$$

Also, show the expanded form as follows:

```
  18
x 24
----
  32      (8 x 4)
  40      (10 x 4)
 160      (20 x 8)
 200      (20 x 10)
----
 432
```

Make sure students understand from where the numbers in the expanded form came and why they were positioned as they were. Additionally, demonstrate the use of red, blue, and green popsicle sticks which represent the ones, tens, and hundreds, respectively to find the answer to the multiplication of any two numbers in the expanded form (e.g., 20 x 8 can be shown as 20 bundles of 8 sticks each). Additionally, show students how the distributive property in multiplication of two two-digit numbers works. For example, 18 x 24 = 18 x (20 + 4) = (18 x 20) + (18 x 4) = 360 + 72 = 432.

```
  18
x 24
----
  72
 360
----
 432
```

Demonstrate the multiplication of other two two-digit numbers using the expanded form, distributive property, and popsicle sticks for assistance. Then, show students the short computational form of multiplying two two-digit numbers using the same exercises as used earlier to demonstrate the expanded form and distributive property. For example,

```
  18
x 24
----
  72
 36
----
 432
```

Stress that the number that is carried is added after the two numbers being multiplied are multiplied. Provide several other examples of the short computational form of multiplication.

Activities:

Day 1:

1. Have pairs of students work together where each student is given a list of 10 multiplication exercises. The exercises should involve the multiplication of two two-digit numbers. Each student should work the 10 exercises using the expanded form, the distributive property and, if necessary, red, blue, and green popsicle sticks.

When students have completed the exercises, each pair should compare their answers. If answer do not agree, students should rework those exercises in question to find where the mistake was made.

2. Using the same list of exercises from Activity # 1 Day 1, have pairs of students work the exercises using the short computational form of multiplying. Optional: Have students check their answers with a calculator.

Day 2:

1. Extend the Introduction Activity to introduce the multiplication of three-digit numbers by two-digit numbers. Use the expanded form, distributive property, and red, blue, green, and orange popsicle sticks for assistance.

2. Adjust Activity #1 Day 1 to include the multiplication of three-digit numbers by two-digit numbers.

3. Adapt Activity #2 Day 1 to include the list of multiplication exercises used in Activity #2 Day2.

Day 3:

1. Play a game where the class is divided into two teams. Give each member of each team a multiplication exercise which adheres to the criteria for construction set forth in the Explanation of Objective. Give the teams 5 minutes for all problems to be worked. The team with the most problems worked correctly when time is called wins.

Culmination

Check students' understanding by having each student work five multiplication exercises which adhere to the criteria for construction set forth in the Explanation of Objective.

Materials

Introduction:

1. Chalk

2. Multiplication exercises with each exercise having two two-digits numbers to use as examples

Day 1:

1. A list of ten multiplication exercises with each exercise having two two-digit numbers for each student

2. Multiplication exercises with each exercise involving the multiplication of a three-digit

number by a two-digit number

3. A list of ten multiplication exercises with each exercise involving the multiplication of a three-digit number by a two-digit number

Day 3:

1. One multiplication exercise which adheres to the criteria for construction set forth in the Explanation of Objective for each member of each of two teams

Culmination:

1. Five multiplication exercises which adhere to the criteria for construction set forth in the Explanation of Objective for each student

Sample Tests

Test 1

Directions: Multiply. Mark your choice on the answer sheet.

1. 214 x 8

(a) 1,612
(b) 1,682
(c) 1,712
(d) 1,782

2. 25 x 22

(a) 550
(b) 547
(c) 540
(d) 520

3. 50 x 6

(a) 110
(b) 106
(c) 306
(d) 300

4. 579 x 21

(a) 11,059
(b) 11,580
(c) 12,159
(d) 12,259

5. 636 x 97

(a) 54,274
(b) 57,685
(c) 61,453
(d) 61,692

6. 403 x 9

(a) 3,727
(b) 3,627
(c) 3,707
(d) 3,606

7. 47 x 67

(a) 3,149
(b) 3,139
(c) 3,114
(d) 2,709

8. 29 x 4

(a) 836
(b) 116
(c) 106
(d) 86

9. 118 x 88

(a) 1,888
(b) 9,856
(c) 10,384
(d) 95,344

10. 55 x 23

(a) 1,118
(b) 1,255
(c) 1,258
(d) 1,265

Sample Tests

Test 2

Directions: Multiply. Mark your choice on the answer sheet.

1. 337 x 6

(a) 2,022
(b) 1,893
(c) 1,882
(d) 1,822

2. 52 x 33

(a) 946
(b) 1,705
(c) 1,716
(d) 1,715

3. 70 x 4

(a) 284
(b) 280
(c) 114
(d) 110

4. 680 x 32

(a) 21,762
(b) 21,760
(c) 21,792
(d) 21,700

5. 747 x 18

(a) 12,405
(b) 13,146
(c) 13,405
(d) 13,446

6. 514 x 8

(a) 4,082
(b) 4,084
(c) 4,112
(d) 4,092

7. 58 x 78

(a) 4,524
(b) 4,504
(c) 4,476
(d) 4,114

8. 28 x 3

(a) 55
(b) 64
(c) 71
(d) 84

9. 229 x 99

(a) 21,780
(b) 21,901
(c) 21,978
(d) 22,671

10. 66 x 34

(a) 2,224
(b) 2,244
(c) 2,144
(d) 2,124

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.8

Divide by a 1-digit whole number divisor.

Explanation of Objective

Divide a 2- or 3-digit whole number by a 1-digit whole number, with and without remainders. Quotients should not contain zeros.

Prerequisite Skills (descending order)

(a) Divide a two-digit number by a one-digit number with and without remainders.
(b) Multiply two-digit numbers, regrouping as necessary.
(c) Indicate instant recall of facts through 81 ÷ 9.
(d) **Master Objective 3.9 (i.e., Divide using basic facts through 45 ÷ 9).**

Vocabulary

division
divide
divided by
dividend
divisor
quotient

Lesson Plan Outline

Introduction:

Give each student a place-value chart as shown below:

hundreds	tens	ones

Additionally, give each student red, blue, and green popsicle sticks to represent the ones, tens, and hundreds, respectively. Write $4\overline{)252}$ on the chalkboard and have students use

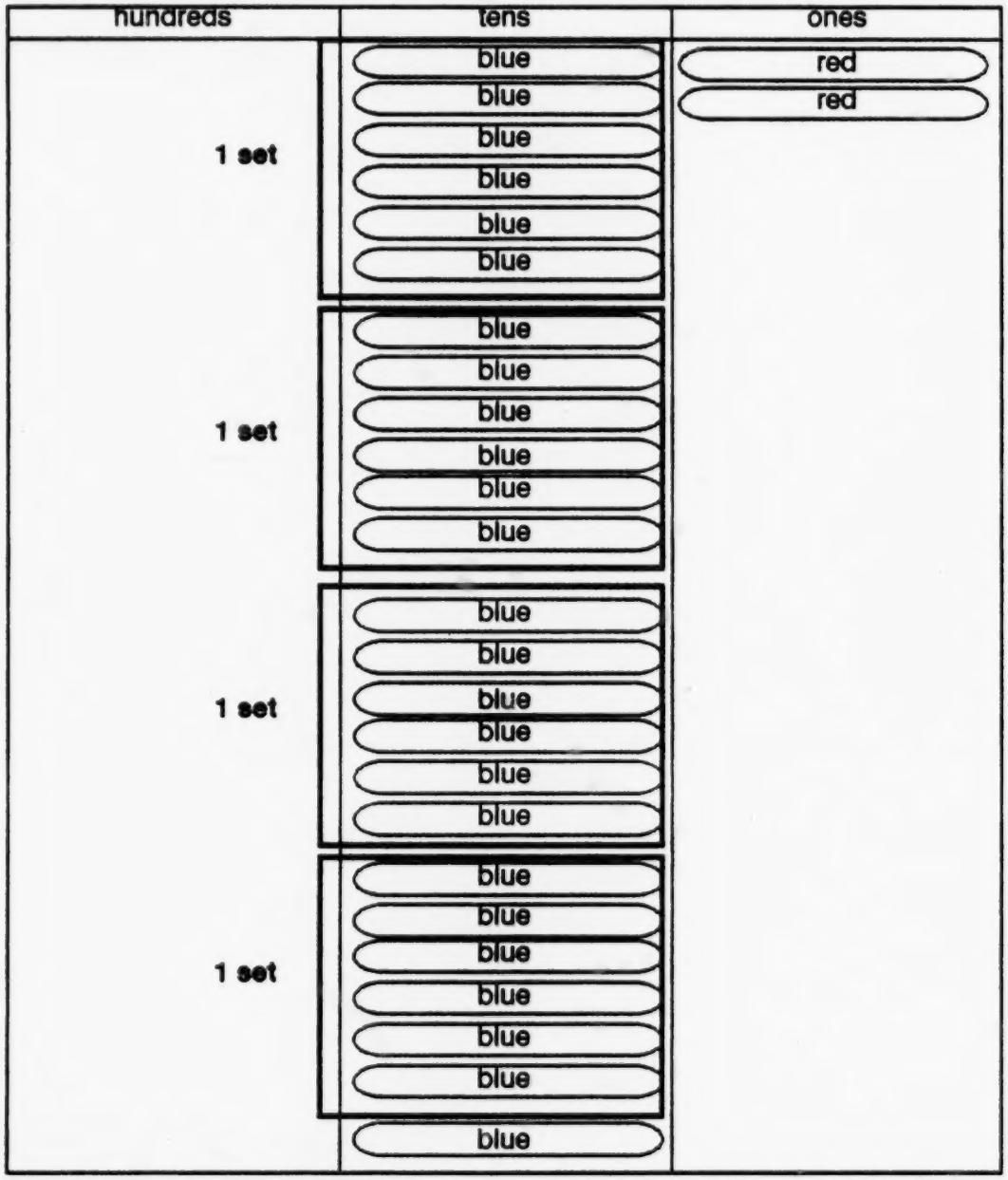
the sticks to show 252 on their place-value charts. Demonstrate how to divide 252 by 4 on the place-value chart and on the board. The place-value chart should look as follows:

hundreds	tens	ones
green	blue	red
green	blue	red
	blue	
	blue	
	blue	

Ask students to look at the hundreds column to see if the 2 hundreds or two green sticks can be divided into 4 sets. Since they can not be divided by 4, exchange the 2 hundreds or 2 green sticks for 20 tens or 20 blue sticks (i.e., 10 tens or 10 blue sticks for each hundred or each green stick). Then, the place-value chart should look as follows:

hundreds	tens	ones
	blue	red
	blue	red
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	
	blue	

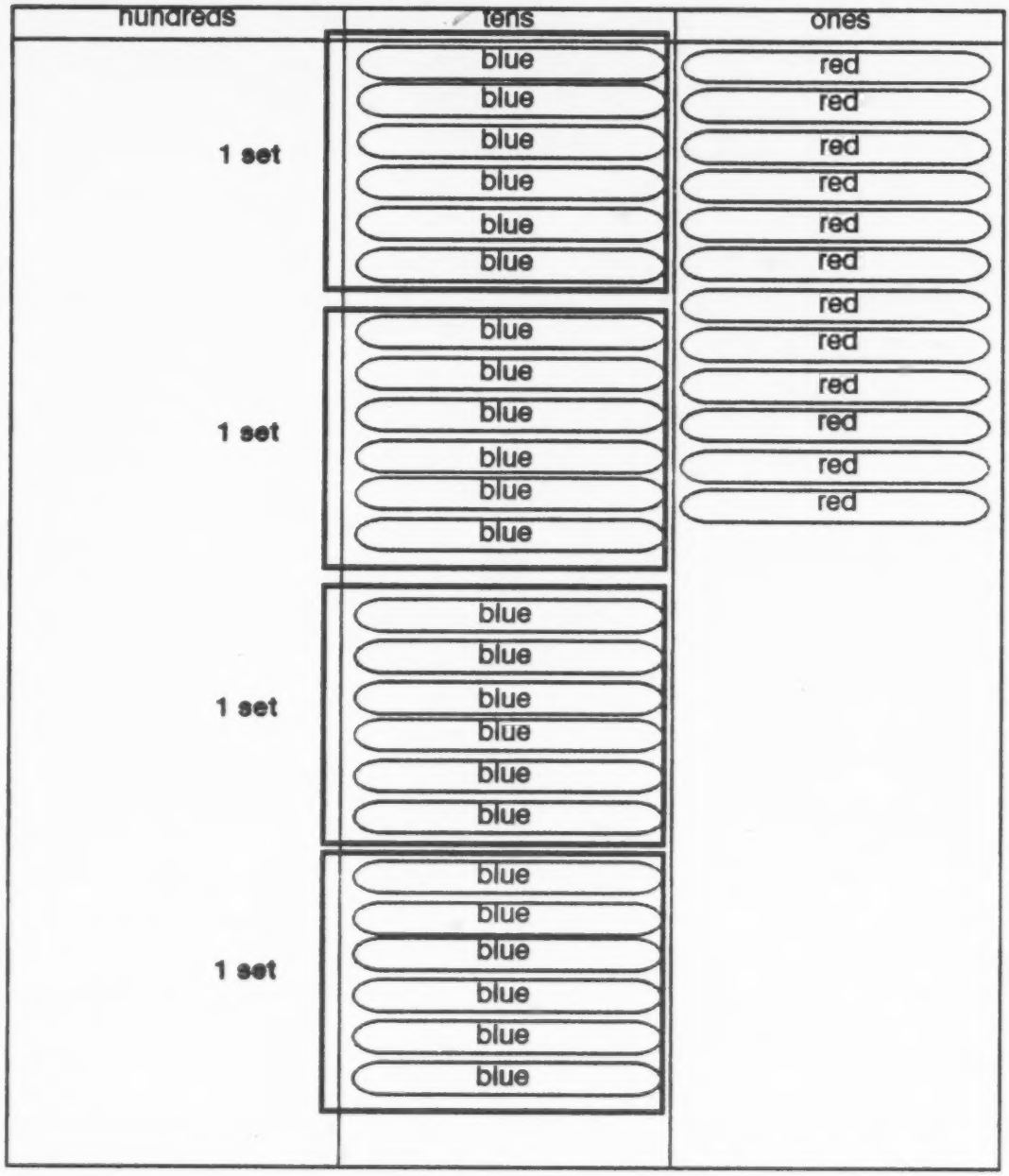
The board should still look as before with $4\overline{)252}$ written on it. However, student's attention should be drawn to the fact that 25 rather than 2 will be divided by 4. Ask students to look at the tens column on their charts and divide the 25 tens or 25 blue sticks into 4 sets with each set having the same number of sticks. Students should have 4 sets of 6 with one left over. In other words, students should see that 25 ÷ 4 = 6 r 1. The place-value chart should look as follows:



The board should show what the students did on their chart and look as follows:

$$\begin{array}{r} 6 \\ 4\overline{)252} \\ -\,24 \\ \hline 1 \end{array}$$

Since the 1 ten or 1 blue stick cannot be divided into 4 sets, demonstrate how it can be exchanged for 10 ones or 10 red sticks. Have the students perform the exchange on their chart. Then, the chart should looks as follows:

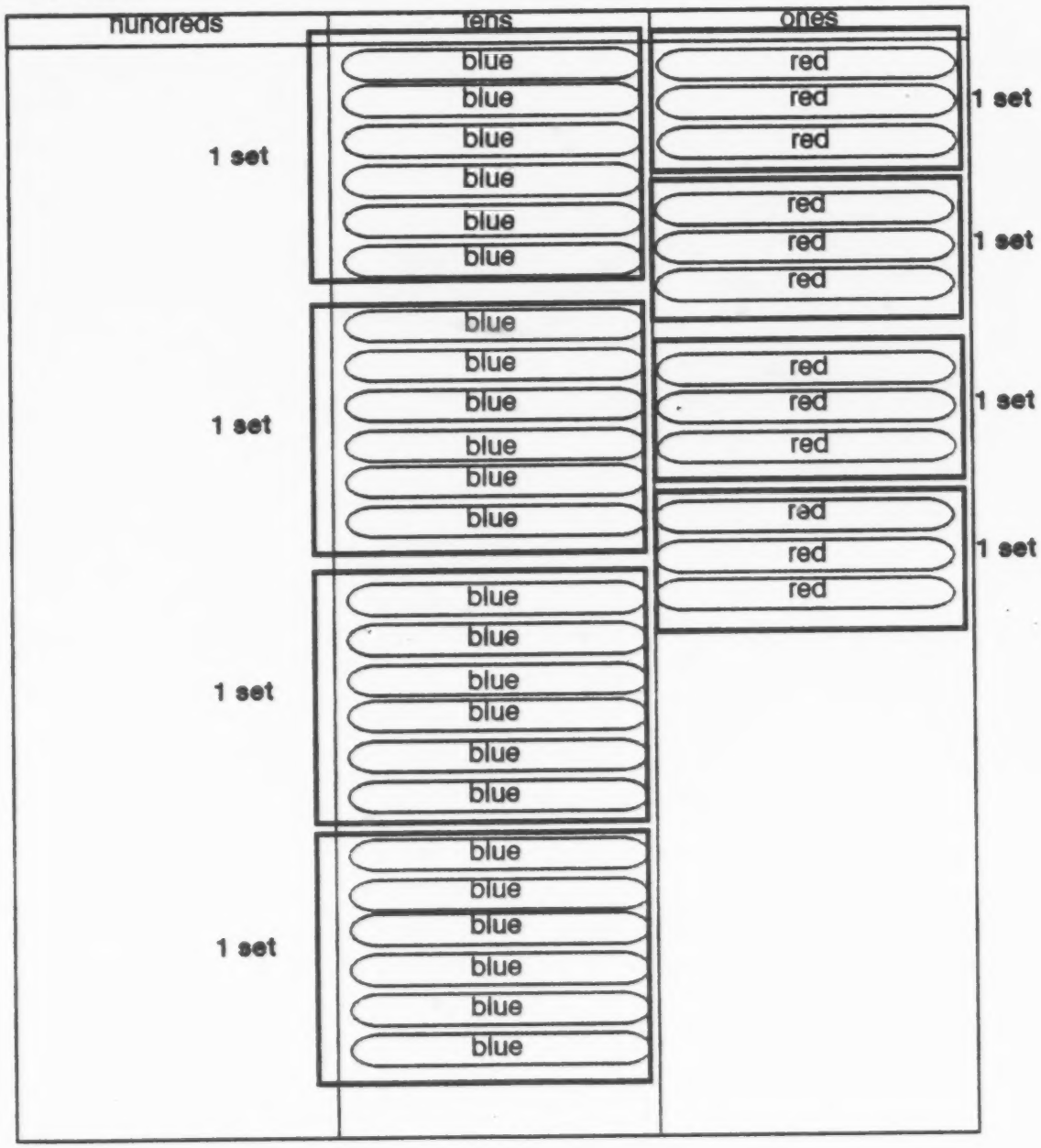


Then, the board should also reflect the exchange as follows:

$$\begin{array}{r} 6 \\ 4\overline{)252} \\ -\,24 \\ \hline 12 \end{array}$$

Ask students to look at the ones column on their charts and divide the 12 ones or the 12

red sticks into 4 sets with the same number in each set. Students should have 4 sets of 3. In other words, students should see that $12 \div 4 = 3$. The place-value chart should look as follows:



The board should look as follows:

$$
\begin{array}{r}
62 \\
4\overline{)252} \\
-\,24 \\
\hline
12 \\
-12 \\
\hline
\end{array}
$$

Discuss the reasonableness of the answer and show students how to use multiplication to check their answers. Follow the same procedure to illustrate the working of additional division exercises being sure to demonstrate exercises that will have remainders in the answers. (Exercises should be constructed according to the criteria set forth in Explanation of Objective.)

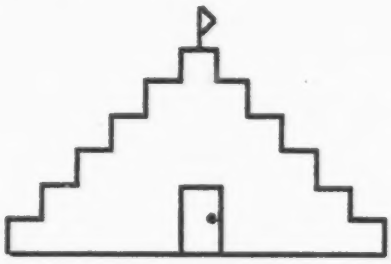
Activities:

Day 1:

1. Have pairs of students play King of the Castle. Have approximately 25 division exercises, which adhere to the criteria for construction set forth in the Explanation of Objective, written on 3 x 5 cards with the correct answers on the backs. Each student should draw a card, work the exercise, and, if correct, advance one space up a castle that has been duplicated on paper. If incorrect, the student should remain on the same space. The first student to reach the flag at the top of the castle wins. An example of a student's card and a castle follows:

Student Card

$5\overline{)196}$



Allow students to use the popsicle sticks and place-value charts from the Introduction activity for assistance.

2. Have pairs of students work together to play a game where each student has 5 cards with a division exercise written on each card. Each student is to work the 5 exercises and then exchange cards with his/her partner. Partners should check each other's work by using multiplication. The partner having worked the most exercises correctly wins the game. Any exercises worked incorrectly should be reworked.

Day 2:

1. Play King of the Castle as in Activity #1 Day 1 but use different division exercises and pair students with different partners.

2. Play the card game as in Activity #2 Day 1 but use different division exercises and pair students with different partners.

Culmination:

Check students' understanding by having each student work 5 division exercises which adhere to the criteria for construction set forth in the Explanation of Objective.

Materials

Note: All division exercises should adhere to the criteria for construction set forth in the Explanation of Objective.

Introduction:

1. A place-value chart showing a column for ones, tens, and hundreds for each student

2. Red, blue, and green popsicle sticks for each student

Day 1:

1. Approximately 25 division exercises written on 3 x 5 cards with correct answers on the backs of cards for each pair of students

2. One castle duplicated on paper for each pair of students (Refer to Activity #1 Day 1 for an example of a castle.)

3. Five cards with a division exercise written on each card for each student

Day 2:

1. Approximately 25 division exercises written on 3 x 5 cards with correct answers on the backs of cards for each pair of students. These exercises should be different from those used in Materials #1 Day 1.

2. One castle duplicated on paper for each pair of students (Refer to Activity #1 Day 1).

3. Five cards with a division exercise written on each card for each student. These exercises should be different from those used in Materials #3 Day 1.

Culmination:

1. Five division exercises for each student

Sample Tests

Test 1

Directions: Divide. Mark your choice on the answer sheet.

1. $6\overline{)314}$

   (a) 49 r 20
   (b) 51 r 4
   (c) 51 r 8
   (d) 52 r 2

2. $7\overline{)85}$

   (a) 12 r 1
   (b) 11 r 8
   (c) 11 r 4
   (d) 10 r 5

3. $4\overline{)304}$

   (a) 73 r 2
   (b) 76
   (c) 701
   (d) 731

4. $3\overline{)190}$

   (a) 42 r 1
   (b) 63 r 1
   (c) 513 r 1
   (d) 633 r 1

5. $2\overline{)113}$

   (a) 56 r 1
   (b) 506 r 1
   (c) 55 r 3
   (d) 416 r 1

6. $9\overline{)486}$

   (a) 504
   (b) 52 r 8
   (c) 54
   (d) 414

7. $8\overline{)524}$

   (a) 53
   (b) 55 r 4
   (c) 65 r 4
   (d) 515 r 4

8. $6\overline{)77}$

   (a) 11 r 6
   (b) 11 r 1
   (c) 13
   (d) 12 r 5

9. $7\overline{)92}$

   (a) 10 r 2
   (b) 11 r 5
   (c) 12 r 1
   (d) 13 r 1

10. $5\overline{)614}$

    (a) 102 r 4
    (b) 122 r 4
    (c) 120 r 4
    (d) 122 r 4

Test 2

Directions: Divide. Mark your choice on the answer sheet.

1. $9\overline{)817}$

   (a) 90 r 7
   (b) 102 r 1
   (c) 81 r 7
   (d) 810 r 7

2. $8\overline{)96}$

   (a) 10 r 6
   (b) 11 r 7
   (c) 12
   (d) 13

3. $5\overline{)405}$

   (a) 61
   (b) 71 r 1
   (c) 71
   (d) 81

4. $4\overline{)201}$

   (a) 32 r 1
   (b) 41
   (c) 50 r 1
   (d) 50

5. $3\overline{)224}$

   (a) 74 r 2
   (b) 614 r 2
   (c) 61 r 1
   (d) 71 r 1

6. $8\overline{)597}$

   (a) 61 r 7
   (b) 74 r 5
   (c) 73 r 3
   (d) 614 r 5

7. $9\overline{)635}$

   (a) 61 r 5
   (b) 70 r 5
   (c) 75 r 5
   (d) 610

8. $7\overline{)88}$

   (a) 11 r 1
   (b) 12 r 4
   (c) 10 r 1
   (d) 93 r 4

9. $7\overline{)92}$

   (a) 121 r 1
   (b) 10 r 2
   (c) 11 r 5
   (d) 13 r 1

10. $6\overline{)715}$

    (a) 119 r 1
    (b) 91 r 5
    (c) 110 r 5
    (d) 914 r 1

Teaching Module (TM)

Mathematics -- Grade 5

Objective 5.9

Divide by a multiple of ten.

Explanation of Objective

Divide a two- or three-digit whole number by a two-digit multiple of ten, with and without regrouping. The quotient should not contain a zero unless it is greater than one and the dividend is a multiple of the divisor.

Prerequisite Skills (descending order)

(a) Multiply through 3-digit by 2-digit whole numbers, regrouping as necessary.
(b) Divide a three-digit number by a one-digit number with and without remainders.
(c) Divide a two-digit number by a one-digit number with and without remainders.
(d) Multiply two-digit numbers, regrouping as necessary.
(e) Indicate instant recall of facts through 81 ÷ 9.
(f) Indicate instant recall of basic facts through 9 x 9.
(g) Divide two numbers using basic facts through 45 ÷ 9.
(h) Multiply two numbers using basic facts through 5 x 9.
(i) Subtract two-digit numbers with and without regrouping (For a listing of skills prerequisite to this skill, refer to TM 3.7)

Vocabulary

multiple
division
divide
divided by
dividend
divisor
quotient

Lesson Plan Outline

Introduction:

Review the multiplication of multiples of ten (TM 5.7) by showing examples such as the following:

10	20	30	40	50	60
x 5	x 2	x 3	x 2	x 4	x 3

Choose one of the examples and show the same number of counters as the product of the example. For example, if 40 x 2 was chosen, then 80 counters would be shown. Have a student arrange the 80 counters into groups of 20 each. Ask how many groups and write the following on the chalkboard:

$$\begin{array}{r} 4 \\ 20\overline{)\,80} \\ -80 \\ \hline \end{array}$$

Then, have a student arrange the counters in groups of 40 each and write the following on the board beside the first exercise:

$$\begin{array}{r} 2 \\ 40\overline{)\,80} \\ -80 \\ \hline \end{array}$$

Ask students if they saw $20\overline{)80}$ and $40\overline{)80}$ and could not use counters, what basic division facts could they use to help find the correct answer. If students do not know, point out that $2\overline{)8}$ and $4\overline{)8}$ are facts to consider when working the two exercises. Ask them what basic division fact would be helpful in working $30\overline{)90}$ and write the following on the board:

$$\begin{array}{r} 3 \\ 30\overline{)\,90} \\ -90 \\ \hline \end{array} \qquad 3\overline{)\,9}$$

Stress the correct placement of the quotient. Also, stress the concept of 3 groups of 30 in 90. Say that even though $3\overline{)9}$ is to be considered, $30\overline{)90}$ is the actual division that must be performed. Therefore, the 3 is to be placed over the 0 in 90. Show several other examples of similar items. Include examples of three-digit numbers divided evenly by two-digit multiples of ten with one-digit quotients. For example:

$$\begin{array}{r} 5 \\ 60\overline{)\,300} \\ -300 \\ \hline \end{array} \qquad \begin{array}{r} 2 \\ 90\overline{)\,180} \\ -180 \\ \hline \end{array} \qquad \begin{array}{r} 4 \\ 60\overline{)\,240} \\ -240 \\ \hline \end{array} \qquad \begin{array}{r} 9 \\ 90\overline{)\,810} \\ -810 \\ \hline \end{array}$$

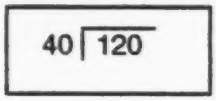
Additionally, show students how to check their answers by multiplying the quotients by the divisors to see if they get the dividends (Optional: Students may also use calculators to check their answers.).

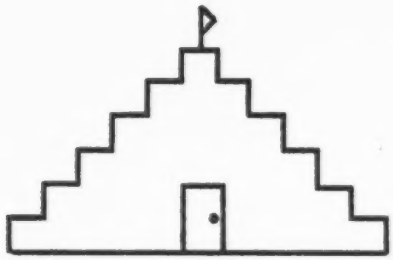
Activities:

Day 1:

1. Have pairs of students play King of the Castle. Have approximately 25 division exercises, where the divisor is a two-digit multiple of ten, the dividend is a two- or three-digit number, and the quotient is a one-digit number with no remainder, written on 3 x

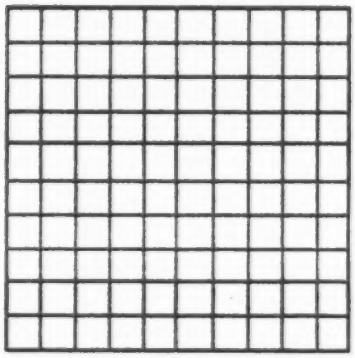
5 cards with the correct answers on the backs. Each student should draw a card, work the exercise, and, if correct, advance one space up a castle that has been duplicated on paper. If incorrect, the student should remain on the same space. The first student to reach the flag at the top of the castle wins. An example of a student's card and a castle follows:



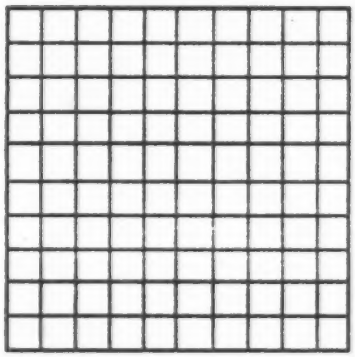


Provide students having difficulty one-hundred squares duplicated on paper to be cut apart, colored, or manipulated in another manner to assist students with division. For example, use two one-hundred squares as follows to work the exercise shown above on the student's card:

One-hundred squares



One-hundred squares



One complete one-hundred square plus two strips of ten squares each cut from the other one-hundred square may be used to represent the number, 120. Then, to divide by 40, groups of 40 squares each could be cut apart or colored to find the answer.

2. Have students play Bingo where the caller card shows a division exercise with the divisor being a two-digit multiple of ten, the dividend a two- or three-digit number, and the quotient a one-digit number having no remainder. Student cards should show correct answers to the exercises. Use many more caller cards than the number of answers on player cards so that no two students have the same identical player cards. The caller should call out the division exercise on each card drawn, write the

exercise on the chalkboard, give students about one minute to work it, and place markers on their cards, if appropriate. The first student to fill his card with markers wins.

Day 2:

1. Adapt the Introduction activity to introduce division of a three-digit number by a two-digit multiple of ten where the quotient is a two-digit number having no remainder. Illustrate the working of the following:

$$\begin{array}{r} 12 \\ 20\overline{)240} \\ -20 \\ \hline 40 \\ -40 \\ \hline \end{array}$$

Point out the basic division fact that should be considered $2\overline{)24}$ and stress the correct placement of the digits in the quotient. Illustrate several other similar division exercises.

2. Have pairs of students play King of the Castle as in Activity #1 Day 1 but use division exercises where the divisor is a two-digit multiple of ten, the dividend is a three-digit number, and the quotient is a two-digit number having no remainder. Allow students to use one-hundred squares for assistance.

3. Have students play Bingo as in Activity #2 Day 1 but use division exercises with a two-digit multiple of ten divisor, a three-digit dividend, and a two-digit quotient with no remainder on the caller cards.

Day 3:

1. Adapt the Introduction activity to introduce division of a two- or three-digit dividend by a two-digit multiple of ten divisor where the quotient is a one- or two-digit number with a remainder.

2. Have pairs of students work together. Give each student within each pair a stack of ten 3 x 5 cards. On each card have one division exercise written. The exercises should involve two- and three-digit dividends with two-digit multiple of ten divisors where the quotients are one- or two-digit numbers with or without remainders. Students are to look at each exercise and use a calculator to find the answer. If the answer has a remainder, students are to write the exercise on paper and work it using long division. Students should follow the same procedure with the other cards. The first student to finish all of his/her cards correctly wins.

3. Have students play King of the Castle as in Activity #1 Day 1 but use division exercises where the divisor is a two-digit multiple of ten, the dividend is a three-digit number, and the quotient is a one- or two-digit number with a remainder.

Culmination:

Check students' understanding by having each student work five division exercises constructed according to the criteria set forth in Explanation of Objective.

Materials

Introduction:

1. Examples of exercises showing multiplication of multiples of ten

2. Examples of three-digit numbers divided evenly by two-digit divisors with one-digit quotients.

Day 1:

1. Approximately 25 division exercises written on 3 x 5 cards with the correct answers on the backs of the card (Refer to Activity #1 Day 1 for criteria for the construction of the exercises.)

2. One castle duplicated on paper for each pair of students (Refer to Activity #1 Day 1 for an example of a castle.)

3. One-hundred squares duplicated on paper to be cut apart, colored, or manipulated in another manner to assist students with division -- at least 2 sets per student.

4. Bingo caller cards with one division exercise per card (Refer to Activity #2 Day 1 for criteria for the construction of the exercise.) and one player card with the correct answers to the exercises written in the squares per student (More caller cards should be used than player cards so that no two students have the same identical player cards.)

5. Markers for Bingo player cards

Day 2:

1. Examples of division exercises (Refer to Activity #1 Day 2 for criteria for construction of exercises.)

2. Approximately 25 division exercises written on 3 x 5 cards with the correct answers on the backs of cards (Refer to Activity #2 Day 2 for criteria for construction of exercises.)

3. One-hundred squares as in Materials #3 Day 1

4. Bingo caller cards and player cards (Refer to Activity #2 Day 1 for criteria for construction of exercises and answers on cards.)

5. Markers for Bingo player cards

Day 3

1. Examples of division exercises (Refer to Activity #1 Day 3 for criteria for construction of exercises.)

2. Ten 3 x 5 cards with each having one division exercise (Refer to Activity #2 Day 3 for criteria for construction of exercises.)

3. Calculator for each student

4. One-hundred squares as in Materials #3 Day 1

5. Approximately 25 division exercises written on 3 x 5 cards with the correct answers on the backs of cards (Refer to Activity #3 Day 3 for criteria for construction of exercises.)

6. One castle duplicated on paper for each pair of students (Refer to Activity #1 Day 1 for an example of a castle.)

Culmination:

1. Five division exercises constructed according to the criteria set forth in Explanation Objective for each student

Sample Tests

Test 1

Directions: Work each exercise. Mark your choice on the answer sheet.

1. $30\overline{)850}$

   (a) 280 r 10
   (b) 28 r 10
   (c) 30
   (d) 25

2. $40\overline{)890}$

   (a) 22 r 10
   (b) 23
   (c) 120
   (d) 220 r 10

3. $20\overline{)800}$

   (a) 30
   (b) 40
   (c) 20
   (d) 60

4. $10\overline{)59}$

   (a) 6
   (b) 50 r 9
   (c) 5 r 9
   (d) 6 r 1

5. $60\overline{)313}$

   (a) 50
   (b) 5 r 3
   (c) 51
   (d) 5 r 13

6. $10\overline{)28}$

   (a) 2 r 8
   (b) 1 r 18
   (c) 20
   (d) 2

7. $40\overline{)455}$

   (a) 11 r 10
   (b) 110
   (c) 11 r 15
   (d) 11 r 5

8. $20\overline{)740}$

   (a) 217
   (b) 37
   (c) 32
   (d) 370

9. $30\overline{)92}$

   (a) 3 r 2
   (b) 21 r 2
   (c) 20
   (d) 24

10. $40\overline{)220}$

    (a) 44
    (b) 50
    (c) 5 r 20
    (d) 50 r 20

Sample Tests

Test 2

Directions: Work each exercise. Mark your choice on the answer sheet.

1. $70\overline{)856}$

   (a) 10
   (b) 11 r 36
   (c) 120 r 16
   (d) 12 r 16

2. $20\overline{)324}$

   (a) 16 r 4
   (b) 11 r 4
   (c) 16
   (d) 160

3. $40\overline{)85}$

   (a) 20 r 5
   (b) 2 r 5
   (c) 11 r 5
   (d) 4 r 5

4. $10\overline{)221}$

   (a) 22
   (b) 22 r 1
   (c) 220
   (d) 20

5. $30\overline{)60}$

   (a) 30
   (b) 11
   (c) 2
   (d) 20

6. $70\overline{)840}$

   (a) 11 r 30
   (b) 10 r 40
   (c) 120
   (d) 12

7. $40\overline{)92}$

   (a) 2 r 12
   (b) 23
   (c) 20 r 12
   (d) 11 r 12

8. $60\overline{)885}$

   (a) 11 r 25
   (b) 14 r 45
   (c) 13 r 5
   (d) 14

9. $20\overline{)240}$

   (a) 12
   (b) 10 r 4
   (c) 120
   (d) 17

10. $10\overline{)36}$

    (a) 30 r 6
    (b) 21 r 6
    (c) 30
    (d) 3 r 6

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.10

Add two fractions with like denominators, renaming the sum as a mixed number or simple fraction. Subtract two fractions with like denominators.

Explanation of Objective

Add or subtract two fractions with like denominators in vertical form where the numerator is less than 10 and the denominator is less than 13.

Prerequisite Skills (descending order)

(a) **Master TM 5.3 (i.e., Change improper fractions to mixed numbers.).**
(b) **Master TM 5.4 (i.e., Simplify proper fractions.).**
(c) Identify equivalent fractions.

Vocabulary

fraction
numerator
denominator
reduce
simplify
simplest form
proper fraction
improper fraction

Lesson Plan Outline

Introduction:

Draw a circle on the chalkboard. Divide it into fourths. Label each division as $^1/_4$. Shade in $^1/_4$ with red chalk and $^2/_4$ with blue chalk. Ask students to tell how many fourths are colored red. Write $^1/_4$ on the chalkboard. Ask how many fourths are colored blue. Write $^2/_4$ on the board. Tell students you want to add the two fractions. Write $^1/_4 + {}^2/_4 =$ on the board. Ask students to look at the circle and tell how many parts are shaded altogether. Write $^3/_4$ as the answer to the equation on the board. Ask students why the numerators were added but the denominators were not added. Elaborate on students' responses. Draw other geometric shapes on the board and follow the same procedure. Be sure to provide examples of adding fractions that result in a fraction that is not in simplest form and needs to be reduced. Stress that an equation is not worked completely until its answer is in simplest form (Simplifying proper fractions is addressed in TM 5.4.).

Additionally, provide examples of adding fractions where the answer is an improper fraction that must be changed to a mixed number. Stress that an equation is not worked completly if the answer is left as an improper fraction (Changing improper fractions to mixed numbers is addressed in TM 5.3.).

Activities: (Note: Refer to the Explanation of Objective for criteria in the construction of fractions for the exercises.)

Day 1:

1. Give pairs of students rectangles that have been duplicated on paper. The rectangles should be divided into equal parts such as halves, thirds, fourths, etc. and shaded with different colors or different patterns to represent addition equations. Have students write equations to show how the rectangles have been shaded and find the answers. After students finish, have them explain how they arrived at their equations and answers.

2. Have pairs of students play Concentration where a match consists of one card showing an addition of fractions equation and the other card showing the answer. Allow students to draw rectangles and other pictorial illustrations for assistance. The student with the most matches at the end of the game wins.

Day 2:

1. Adapt the Introduction Activity to introduce the subtraction of fractions with like denominators. Use geometric figures and shading as in the Introduction but shade in a certain number of parts and erase the number of parts are being subtracted.

2. Adapt Activity #1 Day 1. Give pairs of students subtraction of fractions equations and blank rectangles divided into the appropriate number of equal parts for each equation. For example, if the equation is $^4/_5 - {}^1/_5$, then the corresponding rectangle should be divided into fifths. Students should shade the number of parts to represent the first fraction in each equation and then erase the number of parts being subtracted. After students finish, have them explain their procedures and answers in working each exercise.

3. Extend the Concentration game in Activity #2 Day 1 to include cards showing subtraction of fractions equations and answers.

Culmination:

Check students' understanding by having them work four-exercises of adding fractions with like denominators and four exercises of subtracting fractions with like denominators.

Materials (Note: Refer to the Explanation of Objective for criteria in the construction of fractions for the exercises.)

Introduction:

1. Colored chalk

Activities

Day 1:

1. Rectangles duplicated on paper that have been divided into equal parts such as halves, thirds, fourths, etc. and shaded with different colors or different patterns to represent addition of fractions equations

2. Concentration cards for each pair of students where a match consists of one card showing an addition of fractions equation and the other card showing the answer such as follows:

$^{3}/_{8}$ $+^{2}/_{8}$	matches	$^{5}/_{8}$

Day 2:

1. Chalk

2. Rectanges duplicated on paper that have been divided into equal parts to correspond with subtraction of fractions exercises. For example, if an exercise is $^{4}/_{9}$ - $^{2}/_{9}$, then the corresponding rectangle would be divided into 9 equal parts.

3. Concentration cards for each pair of students where a match consists of one card showing a subtraction of fractions equation and the other card showing the answer such as follows:

$^{10}/_{12}$ $-^{5}/_{12}$	matches	$^{5}/_{12}$

Culmination:

1. Four exercises of adding fractions with like denominators and four exercises of subtracting fractions with like denominators for each student

Sample Tests

Test 1

Directions: Work the exercise. Reduce your answer to its simplest form. Mark your answer on the answer sheet.

Part 1: Addition

1. $\frac{3}{5} + \frac{4}{5}$

(a) $\frac{1}{5}$

(b) $1\frac{2}{5}$

(c) $\frac{5}{7}$

(d) $\frac{7}{10}$

2. $\frac{6}{8} + \frac{1}{8}$

(a) $\frac{7}{8}$

(b) $1\frac{5}{8}$

(c) $\frac{1}{8}$

(d) $\frac{7}{16}$

3. $\frac{5}{12} + \frac{10}{12}$

(a) $\frac{15}{24}$

(b) $1\frac{5}{12}$

(c) $\frac{1}{12}$

(d) $1\frac{1}{4}$

4. $\frac{2}{9} + \frac{6}{9}$

(a) $\frac{8}{18}$

(b) $\frac{8}{9}$

(c) $1\frac{1}{9}$

(d) $\frac{4}{9}$

5. $\frac{4}{10} + \frac{8}{10}$

(a) $1\frac{1}{10}$

(b) $\frac{12}{20}$

(c) $1\frac{1}{5}$

(d) $\frac{4}{10}$

Test 1 (cont.)

Part II: Subtraction

1. $\frac{3}{4} - \frac{2}{4}$

(a) $\frac{1}{4}$

(b) 1

(c) $\frac{2}{4}$

(d) $\frac{3}{4}$

2. $\frac{9}{12} - \frac{7}{12}$

(a) $\frac{1}{12}$

(b) $\frac{1}{2}$

(c) 2

(d) $\frac{1}{6}$

3. $\frac{5}{8} - \frac{3}{8}$

(a) $\frac{1}{8}$

(b) $\frac{1}{2}$

(c) $\frac{1}{4}$

(d) 2

4. $\frac{7}{10} - \frac{4}{10}$

(a) 3

(b) $\frac{1}{3}$

(c) $\frac{1}{10}$

(d) $\frac{3}{10}$

5. $\frac{6}{7} - \frac{1}{7}$

(a) $\frac{1}{5}$

(b) $\frac{5}{7}$

(c) 5

(d) $\frac{1}{7}$

Sample Tests

Test 2

Directions: Work the exercise. Reduce your answer to its simplest form. Mark your answer on the answer sheet.

Part 1: Addition

1. $\frac{2}{6} + \frac{5}{6}$

(a) $\frac{1}{7}$

(b) $1\frac{1}{6}$

(c) $\frac{1}{6}$

(d) $\frac{1}{2}$

2. $\frac{4}{11} + \frac{6}{11}$

(a) $\frac{10}{11}$

(b) $\frac{1}{11}$

(c) $\frac{2}{11}$

(d) $\frac{9}{11}$

3. $\frac{\breve{}}{9} + \frac{2}{9}$

(a) $\frac{1}{3}$

(b) $\frac{1}{9}$

(c) $\frac{7}{9}$

(d) $1\frac{2}{9}$

4. $\frac{3}{8} + \frac{1}{8}$

(a) $\frac{1}{2}$

(b) $\frac{1}{4}$

(c) $\frac{1}{8}$

(d) $1\frac{1}{4}$

5. $\frac{2}{10} + \frac{9}{10}$

(a) $\frac{1}{10}$

(b) $\frac{7}{10}$

(c) $\frac{2}{7}$

(d) $1\frac{1}{10}$

Test 2 (cont.)

Part II: Subtraction

1. $\frac{6}{8} - \frac{2}{8}$

(a) $\frac{1}{8}$

(b) 4

(c) $\frac{1}{2}$

(d) $\frac{3}{8}$

2. $\frac{10}{12} - \frac{4}{12}$

(a) $\frac{1}{2}$

(b) $\frac{1}{12}$

(c) 6

(d) $\frac{5}{12}$

3. $\frac{4}{11} - \frac{1}{11}$

(a) 3

(b) $\frac{5}{11}$

(c) $\frac{2}{11}$

(d) $\frac{3}{11}$

4. $\frac{7}{9} - \frac{2}{9}$

(a) $\frac{2}{7}$

(b) 5

(c) $\frac{5}{9}$

(d) $\frac{5}{7}$

5. $\frac{3}{6} - \frac{1}{6}$

(a) $\frac{3}{6}$

(b) $\frac{1}{3}$

(c) $\frac{1}{2}$

(d) 2

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.11

Add with decimals through hundredths. Subtract with decimals through hundredths.

Explanation of Objective

Add or subtract through hundredths with no more than two digits on either side of the decimal. For addition problems, only two addends should be used.

Prerequisite Skills (descending order)

(a) Read decimals through hundredths.
(b) Subtract decimals through tenths without regrouping.
(c) Add decimals through tenths without regrouping.
(d) Read decimals through tenths.
(e) Identify fractional parts through hundredths.
(f) **Master Objective 5.6 (i.e., Subtract through 5-digit whole numbers, regrouping as necessary.).**
(g) **Master Objective 5.5. (i.e., Add up to four 5-digit whole numbers, regrouping as necessary.)**

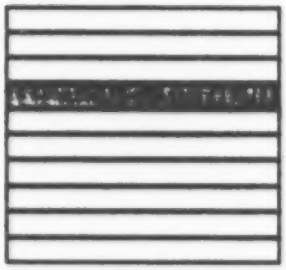
Vocabulary

decimal
decimal fraction
tenths
hundredths
add
addition
subtract
subtraction

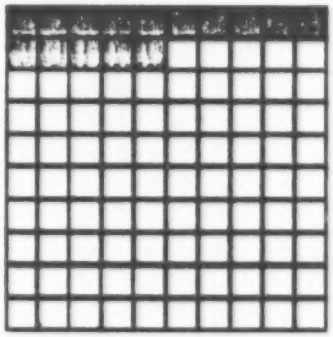
Lesson Plan Outline

Introduction:

Review the concept that fractions describe or represent parts of a whole. Tell students that there are other ways to describe parts. One of those ways is with a decimal or decimal fraction. Show students a square where lines have been drawn to divide it into ten equal strips or parts. For example:



One of the strips or parts should be shaded. Ask students how much of the square is shaded and write $^{1}/_{10}$ on the chalkboard. Then write .1 on the board and say that it is a decimal fraction that means exactly the same and is read the same as the fraction, $^{1}/_{10}$. Draw additional squares on the board with different parts shaded and have students tell the fractions and decimal fractions that describe the parts shaded. Then, show students a square divided into one-hundred equal parts such as follows:



Have 15 of the parts shaded. Ask students to tell the fraction that describes the number of parts shaded. Write $^{15}/_{100}$ on the board. Ask students if they can identify the decimal fraction for $^{15}/_{100}$. Write .15 on the board. Ask students if $^{1}/_{10} + {}^{5}/_{100}$ is the same as $^{15}/_{100}$. Discuss why they are the same using the shaded square. Draw additional squares on the board with different parts shaded and have students tell the fractions and decimal fractions that describe the parts shaded. Then, show students a square divided into one hundred equal parts where 40 parts have been shaded. Ask students to tell the fraction which describes the shaded parts of the squares. Write $^{40}/_{100}$ or $^{4}/_{10}$ on the board. Ask students to tell the decimal fraction for $^{40}/_{100}$ or $^{4}/_{10}$. Write 1.4 and 1.40 on the board and discuss why they mean the same referring back to the shaded squares. Illustrate how to read the decimal fractions. For example, 1.4 would be read, one and four tenths. Stress that the word "and" is used to tell the position of the decimal point in the number. Then, show students 12 squares that have been divided into one-hundred equal parts with all parts shaded and one square that has been divided into one-hundred equal parts with 23 parts shaded. Ask students to tell the fraction and the decimal fraction that describe the shaded parts. Write $12\ ^{23}/_{100}$ and 12.23 on the board. Ask a student to read the decimal fraction. Write "twelve and twenty-three hundredths" on the board as the student read the number. Provide additional examples of decimals using squares and following the same procedure as above. To help students read and understand decimal fractions, give each student a place-value chart as shown below:

ten-thousands	thousands	hundreds	tens	ones	decimal point	tenths	hundreds	thousandths	ten-thousandths

Using a place-value chart for demonstration, cover the right half of the chart including the decimal point. Have students do the same on their charts. Then ask students if they recognize the chart that they see (A place-value chart was used in TM 5.5 and TM 5.6.). Say that the left part of the chart they see is the chart for whole numbers. Uncover the right half of the chart and cover the left half. Say that the right half of the chart is for numbers less than one. Write .5 on the board. Ask students to write it in the appropriate column on their charts. Discuss why it belongs in the tenths column. Read the number. Follow the same procedure with several other numbers.

Activities:

Day 1:

1. Have pairs of students work together. Give each pair many (at least 50) one-hundred squares duplicated on paper. Have students take turns with one student shading squares and the other student writing the decimal fraction which describes the shading. Students should continue until ten decimal fractions have been written.

2. When the pairs of students in Activity #1 Day 1 have written ten decimal fractions, give them a place-value chart like those used in the Introduction. Have each pair write each of their numbers in the appropriate columns on the chart, read the number, and write the word name for the number. When all students have completed this activity, have them share and discuss what they did.

Day 2:

1. Use the red, blue, and green popsicle sticks to represent the ones, tens, and hundreds, respectively, as in TM 5.5 and TM 5.6. Also, introduce the use of yellow and black popsicle sticks to represent tenths and hundredths, respectively. Have the students use the sticks to show the number 52.18 on the place-value charts that were employed in the Introduction. Under the sticks showing 52.18, have students show 13.65 with additional sticks. Then, demonstrate the adding of the two numbers beginning with the hundredths column. Stress the correct placement of the decimal in the sum. Demonstrate the adding of other numbers following the same procedure as above (Refer to Explanation of Objective for criteria in the construction of addition

exercises.).

2. Have pairs of students play a version of Tic Tac Toe. The first student to play should draw a card from a deck of addition exercises with no more than two addends (Each addend should have no more than two digits on either side of the decimal.). Then, the student should find the answer to the exercise using the popsicle sticks from Activity #1 Day 2, if necessary, and blank paper. The answer should be verified with the correct answer written on the back of the card or with a calculator. If it is correct, the student gets to place an X or O on the Tic Tac Toe board. Then, the other student's turn begins. The game continues until one student has three X's or O's in a row and wins. Repeat the game two or three times, but with different students working together.

Day 3:

1. Adapt Activity #1 Day 2 to introduce subtracting decimals.

2. Adapt the Tic Tac Toe game in Activity #2 Day 2 so that the cards that are drawn by the students show subtraction of decimals exercises with no more than two digits on either side of the decimal.

Culmination:

Check students' understanding by having each student work four addition of decimals exercises and four subtraction of decimals exercises which adhere to the criteria for construction in the Explanation of Objective.

Materials

Note: All decimal exercises should adhere to criteria for construction set forth in the Explanation of Objective.

Introduction:

1. A square where lines have been drawn to divide it into ten equal strips or parts with one of the strips shaded (Refer to the Introduction for a specific example.)

2. A square that has been divided into one-hundred equal parts (Refer to the Introduction for a specific example.) with 15 of the parts shaded

3. A square that has been divided into one-hundred equal parts where all parts have been shaded and another square that has been divided into one-hundred equal parts where 40 parts have been shaded.

4. Twelve squares that have been divided into one-hundred equal parts with all parts shaded and one square that has been divided into one-hundred equal parts with 32 parts shaded

5. A place-value chart as illustrated in the Introduction for each student

Day 1:

1. At least 50 one-hundred squares duplicated on paper for each pair of students

2. A place-value chart as was used in the Introduction for each pair of students

Day 2:

1. Red, blue, green, yellow, and black popsicle sticks for each student

2. A Tic Tac Toe board and X and O cards for each pair of students

3. Cards for the Tic Tac Toe game showing addition of decimals exercises (Optional: Answers can be written on the backs of the cards.)

Day 3:

1. Red, blue, green, yellow, and black popsicle sticks for each student

2. A Tic Tac Toe board and X and O cards for each pair of students

3. Cards for the Tic Tac Toe game showing subtraction of decimals exercises (Optional: Answers can be written on the backs of the cards.)

Culmination:

1. Four addition of decimals exercises and four subtraction of decimals exercises for each student

Sample Tests

Test 1

Directions: Work the exercise. Mark your answer on the answer sheet.

Part I Addition:

1. 24.67 + 65.38

(a) 89.95
(b) 0.9005
(c) 90.105
(d) 90.05

2. 10.57 + 3.26

(a) 13.83
(b) 13.813
(c) 0.1383
(d) 13.73

3. 18.35 + 31.76

(a) 0.5011
(b) 49.01
(c) 50.11
(d) 49.41

4. 7.24 + 1.34

(a) 85.80
(b) 8.58
(c) 0.858
(d) 8.10

5. 45.31 + 35.96

(a) 0.8127
(b) 81.27
(c) 70.27
(d) 71.27

Part II Subtraction:

1. 8.35 - 1.42

(a) 6.93
(b) 7.93
(c) 6.13
(d) 9.77

2. 35.78 - 13.79

(a) 22.01
(b) 21.99
(c) 48.47
(d) 49.57

3. 15.88 - 7.26

(a) 12.62
(b) 8.26
(c) 7.62
(d) 8.62

4. 4.64 - 1.05

(a) 5.69
(b) 3.59
(c) 3.69
(d) 3.61

5. 96.50 - 31.29

(a) 65.31
(b) 65.39
(c) 65.21
(d) 67.79

Sample Tests

Test 2

Directions: Work the exercise. Mark your answer on the answer sheet.

Part I Addition:

1. 72.35 + 26.67

(a) 98.92
(b) 94.92
(c) 98.32
(d) 99.02

2. 58.13 + 22.77

(a) 70.80
(b) 70.90
(c) 80.60
(d) 80.90

3. 5.94 + 2.15

(a) 7.09
(b) 7.89
(c) 8.09
(d) 8.89

4. 14.03 + 8.72

(a) 22.75
(b) 22.71
(c) 14.75
(d) 12.75

5. 47.81 + 36.09

(a) 73.80
(b) 83.90
(c) 84.90
(d) 93.90

Part II Subtraction:

1. 61.24 - 15.13

(a) 44.11
(b) 45.11
(c) 46.11
(d) 56.11

2. 69.24 - 34.66

(a) 35.68
(b) 34.58
(c) 34.62
(d) 34.48

3. 6.05 - 3.23

(a) 2.82
(b) 2.22
(c) 3.22
(d) 3.82

4. 25.07 - 7.02

(a) 8.05
(b) 22.05
(c) 18.09
(d) 18.05

5. 98.92 - 47.11

(a) 41.81
(b) 51.81
(c) 50.81
(d) 40.81

Objective 5.12

Tell time to the nearest minute.

Explanation of Objective

Tell time to the nearest minute with no distinction between a.m. and p.m.

Prerequisite Skills (descending order)

(a) Identify the correct time using pictures of clocks showing a specified time (5-minute intervals)
(b) **Master Objective 3.11 (i.e., Tell time to the hour, half hour, or quarter hour).**

Vocabulary

hour
minutes
hour hand
minute hand

Lesson Plan Outline

Introduction:

Give each student his/her own clock to manipulate or have each construct his/her own. Review the following: Show the students a demonstration clock that is displaying 12:00. **Have students show the same time on their clocks. Identify the minute hand and hour** hand. Demonstrate how the minute hand moves all the way around the clock in one hour. **Have students manipulate their own clocks to show the same movement. Demonstrate that the hour hand moves from 12 to 1 to indicate one hour and that when another hour passes the hour hand moves from 1 to 2. Write on the board, 1 hour = 60 minutes, and** say that when the minute hand has moved all the way around the clock 60 minutes have passed. Remind students that the numbers on the clock represent 5-minute intervals and that starting with the numeral 1 on the clock and counting by fives will give the number of minutes after the hour that the minute-hand is indicating. Demonstrate by showing 3:25, 1:30, and 4:45 on the demonstration clock. Then, ask students if they know how they could tell the time if the minute hand was pointing between two numbers on the clock. Show 2:11 on the demonstration clock to illustrate. Tell students that each mark on the clock represents 1 minute and that the number of minutes past the hour can be determined simply by counting. Show several other times on the demonstration clock and help students tell the time. Have them show the same times on their clocks. Write the times

on the board in standard notation. Stress the difference between the minute hand and the hour hand.

Activities:

Day 1:

1. Have groups of three students each work together with one student being the dealer and the other two students being the players. Use 3 x 5 cards with clocks drawn showing various times (Refer to Explanation of Objective for criteria in construction of clocks.). On the backs of cards have the correct times written in standard notation. The dealer must show a card to the two players. The first player to say the correct time keeps the card until the end of the game. Then, the dealer shows another card and follows the same procedure. The player with the most cards at the end of the game wins.

2. Use groups of three students each and 3 x 5 cards as in Activity #1 Day 1 but have various times written in standard notation on the cards instead of clocks. Have students use their clocks from the Introduction activity to see who can show the times on the cards displayed by the dealer first.

Day 2:

1. Use the cards constructed for Activity #1 and Activity #2 Day 1. Have pairs of students work together with each taking a turn drawing a card and either telling the time that the clock shows and writing it in standard notation or showing the time on the card on his/her clock used during the Introduction activity. During each student's turn, he/she must explain to the other student how he/she arrived at his/her answer.

2. Follow the same procedure as was followed in Activity #1 Day 2 but have different pairs of students work together.

Day 3:

1. Divide the class into teams of five members each. Give each member of each team a 3 x 5 card with a clock drawn on it (Refer to Explanation of Objective for criteria for the construction of clocks.) Play a relay where each member must race to the chalkboard, write the time in standard notation that his/her clock is showing, and return to the back of the line. The first team to have all five times written on the board correctly wins (Note: No two team members within teams or among teams should have identical clocks.)

2. Play the relay again as in Activity #1 Day 3 but use different teams.

Culmination:

Check students' understanding by using the demonstration clock to display various times. Have students write the times on 3 x 5 cards and show them. Additionally, show

students various times written on 3 x 5 cards, have students use their individual clocks to illustrate the times, and then, ask students to display the clocks.

Materials: (Note: Refer to Explanation of Objective for criteria for the construction of clocks.)

Introduction:

1. A demonstration clock
2. An individual clock made from paper plates, construction paper, etc. for each student

Day 1:

1. 3 x 5 cards showing clocks displaying various times
2. 3 x 5 cards showing various times written in standard notation
3. Student clocks used in the Introduction activity

Day 2:

1. Both sets of cards constructed for Activity #1 and Activity #2 Day 1
2. Student clocks used in the Introduction activity

Day 3:

1. 3 x 5 cards showing various times - one for each student (No two team members within teams or among teams should have identical clocks.)

Culmination:

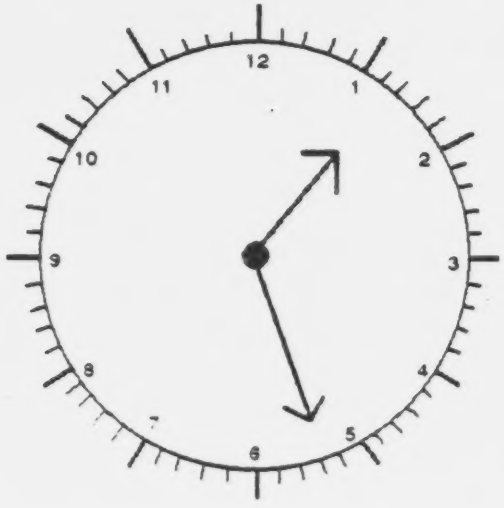
1. 3 x 5 cards from any of the previous activities with some showing various times written in standard notation and the demonstration clock from the Introduction activity
2. Student clocks used in the Introduction activity
3. Blank 3 x 5 cards for each student

Sample Tests

Test 1

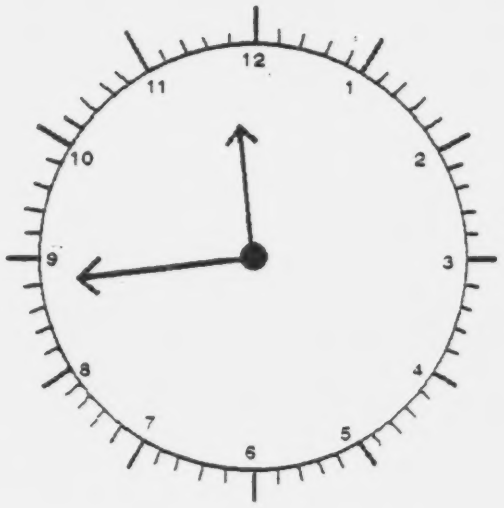
Directions: Choose the correct time shown on the clock. Mark your choice on the answer sheet.

1.



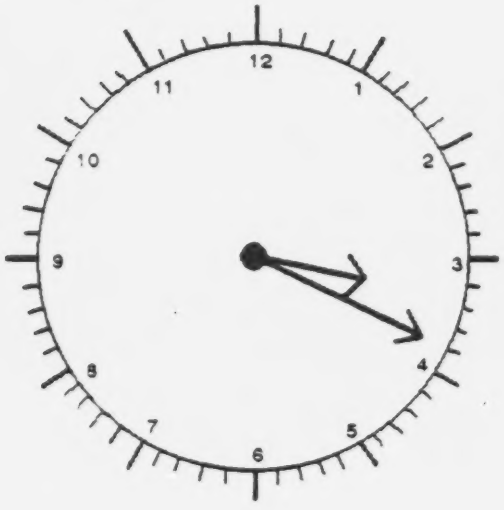
(a) 1:00
(b) 1:27
(c) 5:05
(d) 1:25

2..



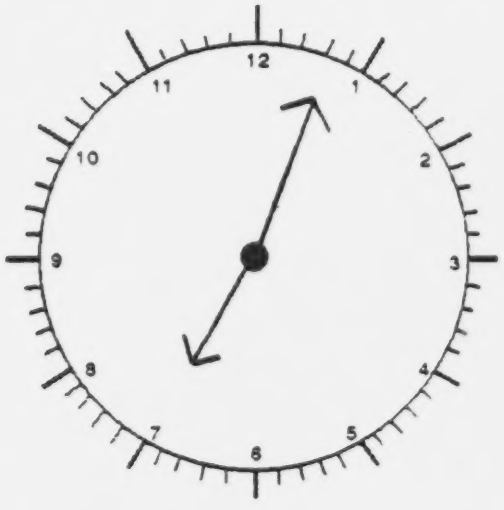
(a) 11:44
(b) 11:45
(c) 8:55
(d) 9:00

3.



(a) 3:20
(b) 4:00
(c) 4:15
(d) 3:19

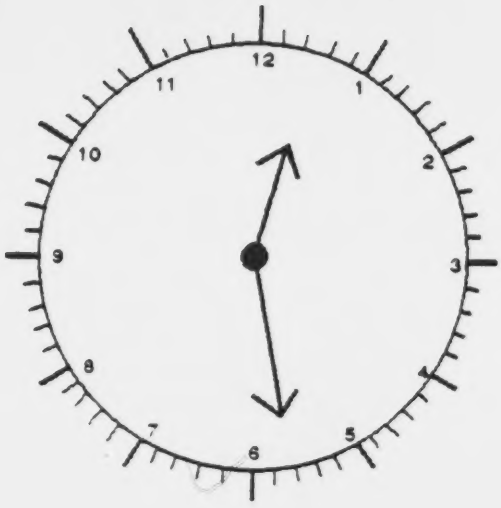
4.



(a) 7:00
(b) 12:35
(c) 7:03
(d) 7:05

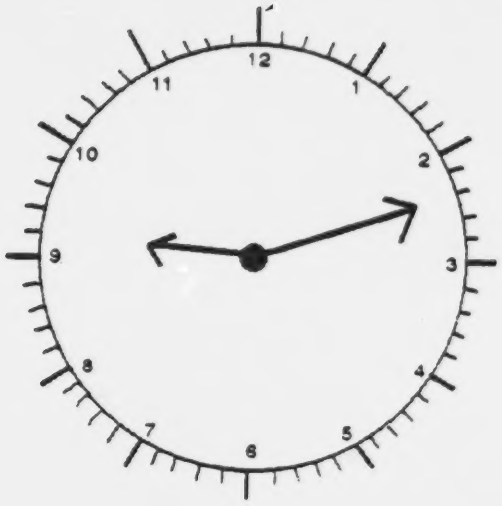
Test 1 (cont.)

5.



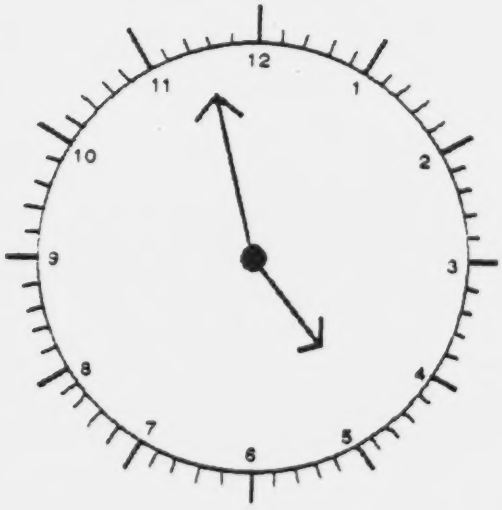
(a) 12:00
(b) 12:28
(c) 12:30
(d) 6:00

6.



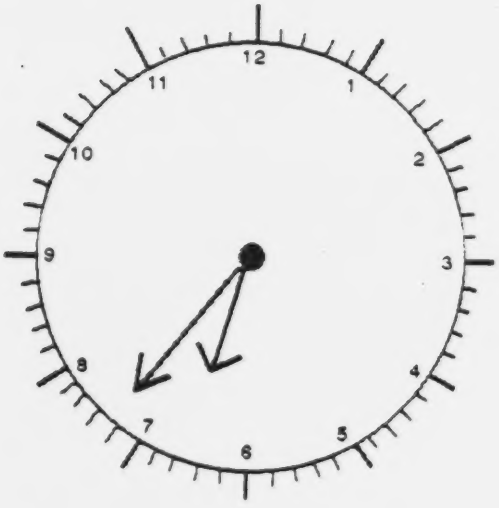
(a) 2:45
(b) 9:00
(c) 9:10
(d) 9:12

7.



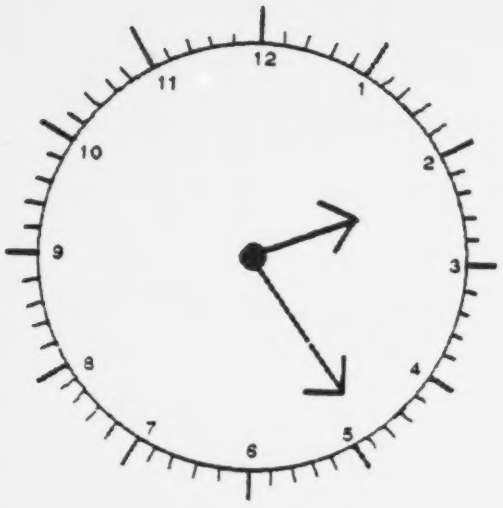
(a) 4:00
(b) 11:20
(c) 4:58
(d) 3:55

8.



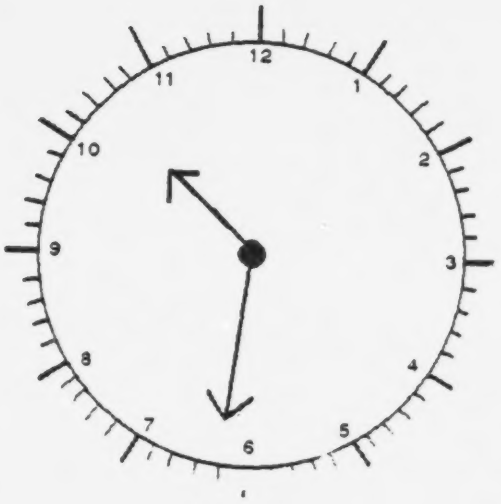
(a) 7:30
(b) 6:00
(c) 6:36
(d) 6:35

9.



(a) 2:24
(b) 2.[illegible]
(c) 5:10
(d) 2:00

10.



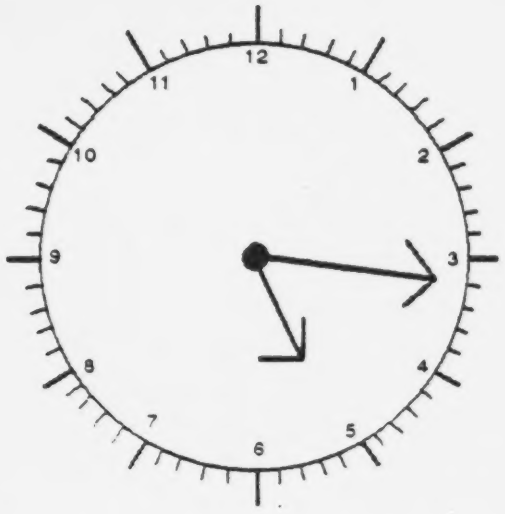
(a) 6:50
(b) 10:00
(c) 10:30
(d) 10:31

Sample Tests

Test 2

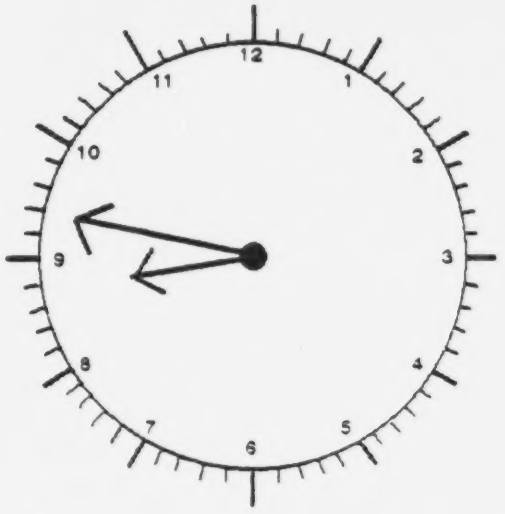
Directions: Choose the correct time shown on the clock. Mark your choice on the answer sheet.

1.



(a) 3:25
(b) 5:15
(c) 5:16
(d) 5:00

2.

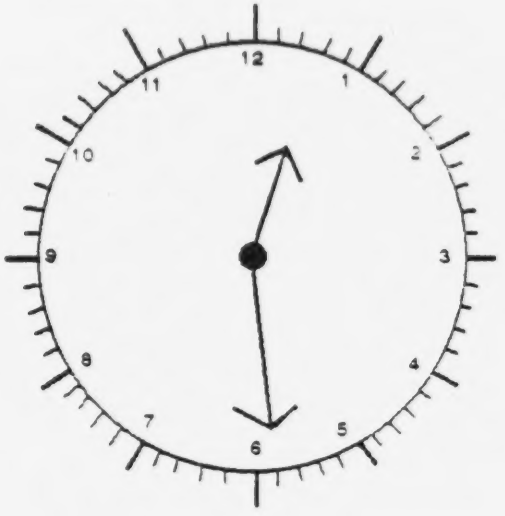


(a) 8:00
(b) 9:40
(c) 8:45
(d) 8:47

3.

(a) 3:00
(b) 3:01
(c) 12:00
(d) 12:15

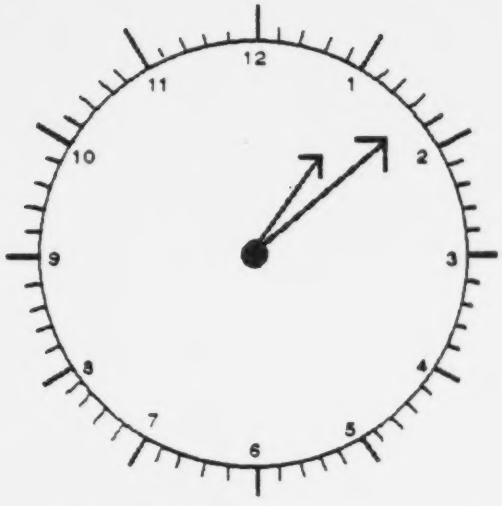
4.



(a) 12:29
(b) 12:30
(c) 6:00
(d) 12:25

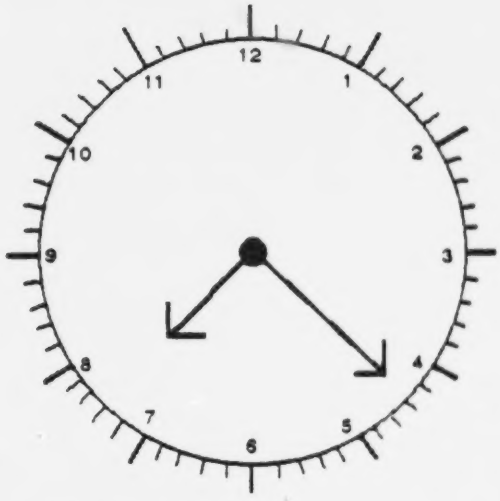
Test 2 (cont.)

5.



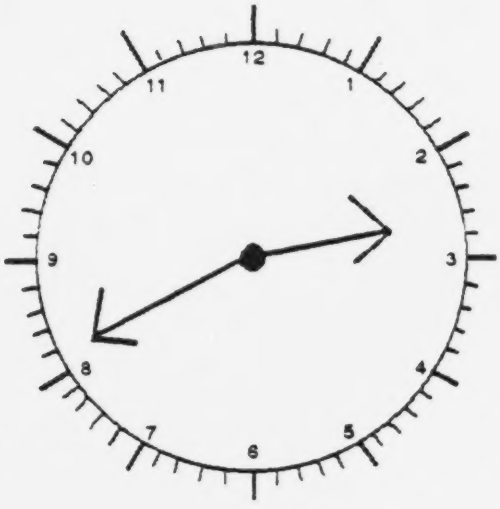
(a) 2:05
(b) 1:10
(c) 1:08
(d) 1:00

6.



(a) 7:22
(b) 7:20
(c) 4:34
(d) 4:00

7.



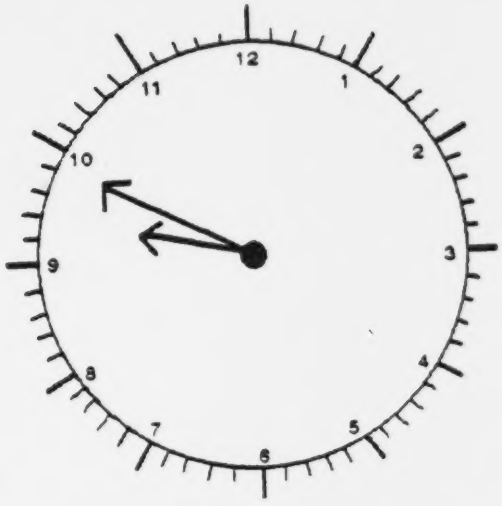
(a) 2:40
(b) 2:41
(c) 8:00
(d) 8:10

8.

(a) 10:00
(b) 10:55
(c) 10:58
(d) 11:50

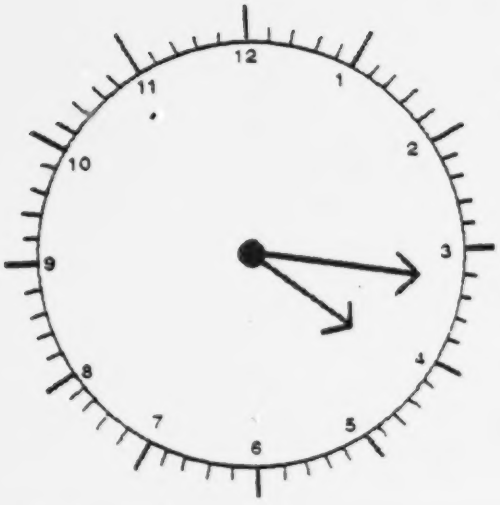
Test 2 (cont.)

9.



(a) 9:00
(b) 9:49
(c) 9:50
(d) 10:00

10.



(a) 4:15
(b) 4:16
(c) 3:00
(d) 3:20

Objective 5.13

Identify unit of measure (English or metric) for problems involving length, capacity, or weight.

Explanation of Objective

Identify the appropriate unit of measure (English or metric) for problems involving length, capacity, or weight. The following units of measure will be examined:

(a) capacity: cup, pint, quart, gallon; or milliliter, liter
(b) length: inch, foot, yard; or millimeter, centimeter, meter
(c) weight: ounces, pounds; or grams, kilorgrams

Prerequisite Skills (descending order)

(a) **Master Objective 5.14 (Identify relationships between English or metric units of measure: capacity, length, and weight.).**
(b) **Master Objective 3.13 (i.e., Select the appropriate unit of measure--English or metric-- for problems involving length.).**

Vocabulary

capacity	millimeter
cup	centimeter
pint	meter
quart	ounce
gallon	pound
milliliter	gram
liter	kilogram
inch	unit of measure
foot	unit of English measure
yard	unit of metric measure

Lesson Plan Outline

Introduction:

Review the equations presented in TM 5.14. Tell students that now that they have an understanding of the different lengths, capacities, and weights of the various English and metric units of measure, they will learn to choose the most appropriate unit to use to meas-

ure any particular item. Begin by focusing upon the English and metric units of measure for length since students should have already mastered Objective 3.13 (Refer to TM 3.13). Use the example employed in TM 3.13, Activity #1 Day 2 (i.e., measuring the classroom door) to illustrate how the meter, one unit of metric measure for length, can be more appropriate for measuring the classroom door than the centimeter, another unit of metric measure for length. Show the correct measurement of an object by placing the edge of the ruler or stick at the upper left edge of the classroom door (Note: If the length is less than halfway between two numbers, use the smaller number. If the length is halfway or more between two numbers, use the larger number.). Demonstrate the measurement of as many items as possible using the millimeter ruler, the centimeter ruler, and the meter stick stressing the most practical unit for measuring each item. Discuss other things to measure and have students decide the most appropriate unit of metric measure for length. Follow the same procedure for illustrating the most practical unit of measure for measuring items with the English units of measure -- the inch, the foot, and the yard. Allow students to measure the items discussed and manipulate all rulers and sticks to further their understanding.

Activities:

Day 1:

1. Give pairs of students a list of items to measure in the classroom and a millimeter ruler, a centimeter ruler, a meter stick, an inch ruler, foot ruler, and a yard stick. First, have them measure the items with each of the metric units of measure, record their findings for each, decide which of the units is more practical, and record their decision. Then, have them follow the same procedure with the English units of measure.

2. After students have completed Activity #1 Day 1, have the pairs of students take turns explaining how they measured a particular item, which metric and/or English unit of measure is the most appropriate and why. Discuss many other items to be measured. Show students how to draw pictures to represent the items to help determine the most appropriate unit of measure.

Day 2:

1. Adapt the introduction activity so that students may become familiar with choosing the most appropriate English or metric unit of measure for capacity to measure an item. Use milliliter, liter, cup, pint, quart, and gallon containers for demonstration. For example, demonstrate the measurement of items such as the following: a bottle of soda, a carton of milk, a large bucket full of water (the bucket should have at least a one gallon capacity), and a can of juice. Use both the milliliter and the liter to measure the items to demonstrate the more appropriate unit of measure (Note: Too much class time will be required to measure large amounts of liquid with a milliliter container. Begin to measure the larger amounts with a milliliter, then stop and point out the impracticality of continuing.) Then, measure each of the items with the English units of measure and follow the same procedure as with the metric units stressing the most appropriate unit

of measure for each item.

2. Adapt Activity #1 Day 1 to include the English and metric units of measure for capacity. Several places in the classroom should be set up so that students may measure with the cup, pint, quart, gallon, milliliter, and liter containers.

3. Adapt Activity #2 Day 1 to include the English and metric units of measure for capacity.

Day 3:

1. Adapt the introduction activity so that students become familiar with choosing the most appropriate English or metric unit of measure for weight to measure an item. Use balances, weights, and scales for demonstration. For example, demonstrate the measurement of items such as the following: a baseball, a brick, a paper clip, a potato, and an ink pen. Use both the gram and the kilogram to measure the items to demonstrate the more appropriate unit of measure. Then, measure each of the items with the English units of measure and follow the same procedure as with the metric units stressing the most appropriate unit of measure for each item.

2. Adapt Activity #1 Day 1 to include the English and metric units of measure for weight. Several areas in the classroom should be set up so that students may measure items using ounces, pounds, grams, and kilograms.

3. Adapt Activity # 2 Day 1 to include the English and metric units of measure for weight.

Culmination:

Check students' understanding by naming an item, asking for the most appropriate English or metric unit of measure for capacity, length, or weight, and having students show a card with the most appropriate unit of measure written on it. For example, ask for the most appropriate unit of English measure for measuring the length of the school building. Students would show the card that says "yard".

Materials

Introduction

1. Millimeter rulers, centimeter rulers, and meter sticks

2. Inch rulers, foot rulers, and yard sticks

3. Items to measure illustrating the usefulness and appropriateness of the millimeter ruler, the centimeter ruler, the meter stick, the inch ruler, the foot ruler, and the yard stick

Day 1:

1. A millimeter ruler, centimeter ruler, meter stick, inch ruler, foot ruler, and yard stick for each pair of students

2. A list of items to measure in the classroom using the materials listed in Materials #1 Day 1 for each pair of students

Day 2

1. Milliliter, liter, cup, pint, quart, and gallon containers

2. Items to measure using the materials listed in Materials #1 Day 2

3. Several areas in the classroom set up so that students may measure the capacity of different items to determine the usefulness and appropriateness of the milliliter, liter, cup, pint, quart, and gallon

Day 3:

1. Balances, weights, and scales to measure the ounces, pounds, grams, and kilograms of items

2. Items to measure using the materials listed in Materials #1 Day 3

3. Several areas in the classroom set up so that students may measure the weight of different items to determine the usefulness and appropriateness of the ounce, pound, gram, and kilogram

Culmination:

1. Cards with the following words (i.e., one word per card) for each student: cup, pint, quart, gallon, milliliter, liter, inch, foot, yard, millimeter, centimeter, meter, ounce, pound, gram, and kilogram

Sample Tests

Test 1

Directions: Choose the correct unit of measure. Mark your choice on the answer sheet.

1. What unit of English measure should be used to measure the weight of a dog?

   (a) pound
   (b) ounce
   (c) gallon
   (d) inch

2. What unit of metric measure should be used to measure the capacity of a bathtub full of water?

   (a) kilogram
   (b) millimeter
   (c) liter
   (d) gram

3. What unit of metric measure should be used to measure the length of a pencil?

   (a) gram
   (b) kilogram
   (c) milliliter
   (d) centimeter

4. What unit of English measure should be used to measure the weight of an apple?

   (a) ounce
   (b) pound
   (c) quart
   (d) cup

5. What unit of English measure should be used to measure the length of a shoe?

   (a) yard
   (b) inch
   (c) quart
   (d) ounce

Test 1 (cont.)

6. What unit of English measure should be used to measure the capacity of a large bucket of water?

(a) yard
(b) gallon
(c) ounce
(d) pound

7. What unit of metric measure should be used to measure the weight of a nickel?

(a) milliliter
(b) meter
(c) gram
(d) millimeter

8. What unit of English measure should be used to measure the capacity of a glass of milk?

(a) gallon
(b) ounce
(c) pound
(d) cup

9. What unit of metric measure should be used to measure the weight of a person?

(a) liter
(b) kilogram
(c) millimeter
(d) meter

10. What unit of English measure should be used to measure the length of a car?

(a) yard
(b) inch
(c) cup
(d) quart

11. What unit of metric measure should be used to measure the length of a key?

(a) meter
(b) milliliter
(c) millimeter
(d) gram

Test 1 (cont.)

12. What unit of English measure should be used to measure the capacity of a can of paint?

(a) quart
(b) ounce
(c) pound
(d) inch

13. What unit of metric measure should be used to measure the capacity of a bottle of perfume?

(a) millimeter
(b) meter
(c) kilogram
(d) milliliter

14. What unit of English measure should be used to measure the length of a couch?

(a) cup
(b) foot
(c) pound
(d) gallon

15. What unit of English measure should be used to measure the capacity of a container of yogurt?

(a) pint
(b) foot
(c) ounce
(d) pound

16. What unit of metric measure is closest to the length of one yard?

(a) millimeter
(b) gram
(c) meter
(d) milliliter

Test 2

Directions: Choose the correct unit of measure. Mark your choice on the answer sheet.

1. What unit of English measure should be used to measure the weight of a bag of potatoes?

   (a) pound
   (b) ounce
   (c) gallon
   (d) inch

2. What unit of metric measure should be used to measure the capacity of a bottle of milk?

   (a) millimeter
   (b) meter
   (c) kilogram
   (d) milliliter

3. What unit of English measure should be used to measure the length of your foot?

   (a) yard
   (b) inch
   (c) quart
   (d) ounce

4. What unit of metric measure should be used to measure the length of an ink pen?

   (a) gram
   (b) kilogram
   (c) milliliter
   (d) centimeter

5. What unit of metric measure should be used to measure the weight of a paper clip?

   (a) milliliter
   (b) meter
   (c) gram
   (d) millimeter

Test 2 (cont.)

6. What unit of English measure should be used to measure the capacity of a glass of juice?

(a) gallon
(b) ounce
(c) pound
(d) cup

7. What unit of metric measure should be used to measure the capacity of a child's swimming pool?

(a) kilogram
(b) millimeter
(c) liter
(d) gram

8. What unit of English measure should be used to measure the weight of a banana?

(a) ounce
(b) pound
(c) quart
(d) cup

9. What unit of metric measure should be used to measure the length of a stapler?

(a) meter
(b) milliliter
(c) millimeter
(d) gram

10. What unit of English measure should be used to measure the capacity of a carton of milk?

(a) quart
(b) ounce
(c) pound
(d) inch

11. What unit of English measure should be used to measure the length of a piano?

(a) cup
(b) foot
(c) pound
(d) gallon

Test 2 (cont.)

12. What unit of English measure should be used to measure the capacity of a bowl full of soup?

(a) pint
(b) foot
(c) ounce
(d) pound

13. What unit of metric measure should be used to measure the weight of a child?

(a) liter
(b) kilogram
(c) millimeter
(d) meter

14. What unit of English measure should be used to measure the length of a truck?

(a) yard
(b) inch
(c) cup
(d) quart

15. What unit of English measure should be used to measure the capacity of the gas tank of a car?

(a) yard
(b) gallon
(c) ounce
(d) pound

16. What unit of metric measure should be used to measure the length of a football field?

(a) millimeter
(b) gram
(c) meter
(d) milliliter

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.14

Identify relationships between English or metric units of measure: capacity, length, and weight.

Explanation of Objective

Identify relationships between English or metric units of measure:

(a) capacity: cup, pint, quart, gallon; or milliliter, liter
(b) length: inch, foot, yard; or millimeter, centimeter, meter
(c) weight: ounces, pounds; or grams, kilograms

No conversions between systems shall be used. Only successive units of measure may be used (e.g., pints to quarts, not pints to gallons). In the comparison of units, the smaller unit must be listed first and the larger must be limited to one (e.g., _____ inches = 1 foot).

Prerequisite Skills (descending order)

(a) **Master Objective 3.13 (i.e., Select the appropriate unit of measure--English or metric--for problems involving length.).**

Vocabulary

capacity	millimeter
cup	centimeter
pint	meter
quart	ounce
gallon	pound
milliliter	gram
liter	kilogram
inch	unit of measure
foot	unit of English measure
yard	unit of metric measure

Lesson Plan Outline

Introduction:

Show students a cup container, a pint container, a quart container, and a gallon container. Tell them that a cup, a pint, a quart, and a gallon are English units of measure (i.e., used in the United States) for measuring capacity or the amount that an object will hold when it is filled. Also say that the measures of capacity are usually used for measuring liquids.

Examine the cup and pint containers first. Write ____ cups = 1 pint on the board and have students estimate the number of cups in a pint. Write the estimates on the board. Use water or sand to fill the cup and in turn fill the pint so that students see that 2 cups = 1 pint. Write a 2 beside cups on the board. Then, show the pint and quart containers. Write _____ pints = 1 quart on the board and have students estimate the number of pints in a quart. Write the estimates on the board. Use water or sand to show that 2 pints = 1 quart and write a 2 beside pints on the board. Follow the same procedure to illustrate that 4 quarts = 1 gallon. Allow students to take turns filling and emptying containers so that students get a deeper understanding of these units of capacity. Remind students that the cup, the pint, the quart, and the gallon are all English units of measure. Then, say that not only are there English units of measure for capacity, there are also metric units of measure (i.e., those used worldwide) for capacity. These metric units are the milliliter and liter. Show students one cubic centimeter (use one white cuisenaire rod for this). Say that if the white rod were a container to be filled, it would hold 1 milliliter. Show students a liter container. Write _____ milliliters = 1 liter on the board and ask students to estimate the number of milliliters in a liter. Write the estimates on the board. Demonstrating that 1,000 milliliters = 1 liter would be impractical. Simply tell students that if you filled up the cubic centimeter with sand or water 1,000 times and poured it into the liter container, the liter container would be full. To help students grasp this unit of measure, use 100 white rod cubic centimeters to make one complete layer in the bottom of the liter container. Then, show that 10 layers of 100 cubic centimeters would be needed to fill the liter container by demonstrating that the liter container is 10 cubic centimeters high. In other words, 10 layers of white rods with 100 white rods in each layer equals 1,000 whilte rods or 1,000 cubic centimeters or 1,000 milliliters or 1 liter. Allow students to handle the rod representing the milliliter and the liter container so that they may increase their knowledge about the metric units of measure for capacity. Review the four equations on the board.

Activities:

Day 1:

1. Use the containers and sand or water from the introduction activity to assist students in this activity. Erase the equations written on the board in the introduction activity, but have them duplicated on paper in the following manner:

_____ cups = 1 pint

_____ pints = 1 quart

_____ quarts = 1 gallon

_____ milliliters = 1 liter

Have students work in pairs. Each student should complete the equations using the containers and sand or water, if necessary. After each student has completed all four equations, students should compare answers. If the answers do not agree, students should attempt to discover which, if either, is correct by manipulation of the containers

and sand or water.

2. Divide students into groups of 4 each and have each team form a vertical line (i.e., members should stand one behind the other). Give each of the four members in each team a 3 x 5 card with one of the equations for capacity written on it. Give each of the students in the #1 position, the same equation to be completed (e.g., _____ inches = 1 foot). Give each of the students in the #2 position the same equation but different from the one given the students in the #1 position. Follow the same procedure for the students in the #3 and #4 positions. Play a relay where all of the students in the #1 position go to the board, write the equation, and complete it. Then, the #2 position members go to the board and follow the same procedure. The #3 and #4 position members also follow the same procedure. The first team to get all four equations written on the board correctly wins.

Day 2:

1. Adapt the Introduction activity to focus upon the English (i.e. inch, foot, yard) and metric (i.e., millimeter, centimeter, meter) units of measure for length. All of the English and metric units of measure except the millimeter should be a review of Objective 3.13 taught in Grade 3. Discuss two units of measure at the same time as in the Introduction activity. Discuss the following equations in the order given below:

_____ inches = 1 foot

_____ feet = 1 yard

_____ millimeters = 1 centimeter

_____ centimeters = 1 meter

Have students estimate and then demonstrate the number to insert in each equation. Use inch rulers, foot rulers, yard sticks, millimeter rulers, centimeter rulers, and meter sticks and allow students to manipulate them to further their understanding of units of measure for length. Additionally, before class, measure items to discover those that are one inch, more than one inch, one foot, more than one foot, one yard, more than one yard, one millimeter, more than one millimeter, one centimeter, more than one centimeter, one meter, and more than one meter (e.g. a book may be one foot long). Use each of the items as topics of discussion. Allow students to handle the items and estimate their lengths. Record the estimates, measure the items, and record the items' lengths.

2. Adapt Activity #1 Day 1 to include the equations used in Activity #1 Day 2 and the inch rulers, foot rulers, yard sticks, millimeter rulers, centimeter rulers, and meter sticks.

3. Play the relay game described in Activity #2 Day 1 but use the four equations used in Activity #1 Day 2.

Day 3:

1. Adapt the Introduction activity to focus upon the English (i.e., ounce, pound) and metric (i.e., gram, kilogram) units of measure for weight. Discuss two units of measure and their corresponding equations at the same time as in the Introduction activity. The following equations are to be examined:

_____ ounces = 1 pound

_____ grams = 1 kilogram

Have students estimate and then demonstrate the number to insert in each equation. Use balances and weights to demonstrate and allow students to manipulate them to increase their understanding of the units of measure for weight. When discussing gram and kilogram, point out that 1 milliliter of very cold water weighs 1 gram and 1 liter of water weighs 1 kilogram. Use the white cuisenaire rod, the liter container, and the water or sand used earlier to illustrate. Additionally, before class, measure items to discover those that weigh one ounce, more than one ounce, one pound, more than one pound, one gram, more than one gram, one kilogram, and more than one kilogram (e.g., an individual-mixed package of artificial sweetener weighs 1 gram). Use each of the items as topics of discussion. Allow students to handle the items and estimate their weights. Record the estimates, weigh the items, and record the items' weights.

2. Adapt Activity #1 Day 1 to include the equations used in Activity #1 Day 3 and the balances and weights.

3. Play the relay game described in Activity #2 Day 1 but use the two equations used in Activity #1 Day 3 and use teams of two members each.

4. Duplicate on paper the ten equations involving units of measure focused upon in this module. Have pairs of students race to see who can complete all of the equations correctly first. The equations should be duplicated as follows but in no particular order:

_____ cups = 1 pint

_____ pints = 1 quart

_____ quarts = 1 gallon

_____ milliliters = 1 liter

_____ inches = 1 foot

_____ feet = 1 yard

_____ millimeters = 1 centimeter

_____ centimeters = 1 meter

_____ ounces = 1 pound

_____ grams = 1 kilogram

Culmination:

Check students' understanding by writing each of the ten equations focused upon in this module on the board. As you point to each item, have students write the answer on a 3 x 5 card and display it.

Materials

Introduction:

1. A cup container; a pint container; a quart container; a gallon container; a white cuisenaire rod to represent a milliliter container; and a liter container

2. Water and/or sand

Day 1:

1. The following equations duplicated on paper for each student:

_____ cups = 1 pint

_____ pints = 1 quart

_____ quarts = 1 gallon

_____ milliliter = 1 liter

2. The containers listed in Materials #1 Introduction

3. Water and/or sand

4. Four 3 x 5 cards for each team with one of the four equations from Materials #1 Day 1 written on each card

Day 2:

1. At least one each of the following: inch ruler, foot ruler, yard stick, millimeter ruler, centimeter ruler, and meter stick

2. Items measuring one inch, more than one inch, one foot, more than one foot, one yard, more than one yard, one millimeter, more than one millimeter, one centimeter, more than

one centimeter, one meter, and more than one meter

3. The following equations duplicated on paper for each student:

_____ inches = 1 foot

_____ feet = 1 yard

_____ millimeters = 1 centimeter

_____ centimeters = 1 meter

4. Four 3 x 5 cards for each team with one of the four equations from Materials #3 Day 2 written on each card

5. The following equations duplicated on paper for each student:

_____ ounces = 1 pound

_____ grams = 1 kilogram

6. Two 3 x 5 cards for each team with one of the two equations from Materials #5 Day 3 written on each card

7. The following equations duplicated on paper in no particular order for each student:

_____ cups = 1 pint

_____ pints = 1 quart

_____ quarts = 1 gallon

_____ milliliters = 1 liter

_____ inches = 1 foot

_____ feet = 1 yard

_____ millimeters = 1 centimeter

_____ centimeters = 1 meter

_____ ounces = 1 pound

_____ grams = 1 kilogram

Culmination:

1. Ten 3 x 5 cards for each student

Sample Tests

Test 1

Directions: Choose the correct number to fill the blank. Mark your choice on the answer sheet.

1. _____ pints = 1 quart

(a) 2
(b) 4
(c) 8
(d) 10

2. _____ grams = 1 kilogram

(a) 10
(b) 100
(c) 1,000
(d) 10,000

3. _____ inches = 1 foot

(a) 2
(b) 6
(c) 8
(d) 12

4. _____ millimeters = 1 centimeter

(a) 10
(b) 100
(c) 1,000
(d) 10,000

5. _____ ounces = 1 pound

(a) 8
(b) 12
(c) 16
(d) 20

6. _____ quarts = 1 gallon

(a) 2
(b) 4
(c) 6
(d) 8

7. _____ millliliters = 1 liter

(a) 10
(b) 100
(c) 1,000
(d) 10,000

8. _____ feet = 1 yard

(a) 3
(b) 4
(c) 6
(d) 2

9. _____ centimeters = 1 meter

(a) 10
(b) 100
(c) 1,000
(d) 10,000

10. _____ cups = 1 pint

(a) 2
(b) 4
(c) 6
(d) 8

Sample Tests

Test 2

Directions: Choose the correct number to fill the blank. Mark your choice on the answer sheet.

1. _____ grams = 1 kilogram

(a) 10
(b) 100
(c) 1,000
(d) 10,000

2. _____ millimeters = 1 centimeter

(a) 10
(b) 100
(c) 1,000
(d) 10,000

3. _____ quarts = 1 gallon

(a) 2
(b) 4
(c) 6
(d) 8

4. _____ centimeters = 1 meter

(a) 10
(b) 100
(c) 1,000
(d) 10,000

5. _____ inches = 1 foot

(a) 2
(b) 6
(c) 8
(d) 12

6. _____ cups = 1 pint

(a) 2
(b) 4
(c) 6
(d) 8

7. _____ milliliters = 1 liter

(a) 10
(b) 100
(c) 1,000
(d) 10,000

8. _____ ounces = 1 pound

(a) 8
(b) 12
(c) 16
(d) 20

9. _____ pints = 1 quart

(a) 2
(b) 4
(c) 8
(d) 10

10. _____ feet = 1 yard

(a) 3
(b) 4
(c) 6
(d) 2

Objective 5.15

Determine weight to the nearest pound or kilogram. Measure length to the nearest centimeter or quarter inch.

Explanation of Objective

Measure length or weight of a pictured object to the nearest unit (length = cm or $^1/_4$ in; weight = lb or kg).

Prerequisite Skills (descending order)

(a) **Master Objective 5.14 (i.e., Identify relationships between English or metric units of measure: capacity, length, and weight.).**
(b) **Master Objective 5.13 (i.e., Identify unit of measure--English or metric--for problems involving capacity, length, and weight.).**
(c) **Master Objective 3.13 (i.e., Select the appropriate unit of measure--English or metric--for problems involving length.).**
(d) **Master Objective 3.12 (i.e., Measure length to the nearest centimeter or inch.).**

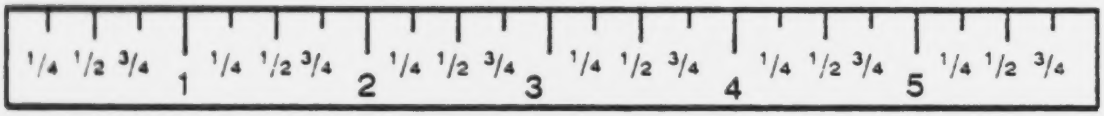
Vocabulary

pound
kilogram
scale
centimeter
inch
half inch
quarter inch
ruler

Lesson Plan Outline

Introduction:

Review measuring the length of objects to the nearest centimeter and inch as taught in TM 3.12, TM 5.13, and TM 5.14. Introduce measuring to the nearest half inch and quarter inch by giving each student a strip of paper 1 inch long. Ask students if they can fold the paper to show $^1/_2$ inch. Then, ask students if they can fold the $^1/_2$ inch to show $^1/_4$ inch. Have students open the paper and notice that 4 creases have been made that divides the 1 inch paper into fourths or 4 equal parts. Draw a ruler on the board like the following:



Point out that 1/2 and 2/4 are equivalent fractions. Then, draw several objects, one at a time, above the ruler and demonstrate measuring to the nearest quarter inch. Remind students that if the length of an object is halfway or more between two markings, then use the larger marking to designate length. If the length is less than halfway between two markings, use the smaller marking to designate length. Demonstrate the measuring of several other items to the nearest centimeter and quarter inch using real rulers and real objects.

Activities:

Day 1:

1. Give each student line segments of different lengths reproduced on paper. First, have students measure the line segments to the nearest centimeter and record their answers. Then, have them measure to the nearest quarter inch and record their answers. Have pairs of students compare their answers. If their answers are not the same for any line segment, then students should measure that line segment again to see where the mistake was made.

2. Give pairs of students a list of ten items in the classroom that they must measure both to the nearest centimeter and the nearest quarter inch. Students should record their answers. When all pairs have finished, have each pair demonstrate the measurement of at least one item from the list.

Day 2:

1. Adapt the introduction activity to introduce determining the weight of an object to the nearest pound or kilogram. Use a scale with markings to 1/2 pound and kilogram. Demonstrate the weighing of various objects to the nearest pound and nearest kilogram.

2. Give pairs of students a list of ten objects of which they must determine the weight to the nearest pound and nearest kilogram. Have them record their answers. After students have completed weighing the objects, have them demonstrate how they arrived at their answers.

Culmination:

Give each student three pictured centimeter rulers and three pictured inch rulers with quarter inch markings. Objects should be drawn above each ruler. Have students identify the length of each object. Give each student three pictured kilogram scales and three pictured pound scales with markings to the half pound. Objects should be drawn above

each scale. Have students identify the weight of each object.

Materials

Introduction:

1. Items to measure to the nearest centimeter and quarter inch.

Day 1:

1. Line segments of different lengths reproduced on paper for each student
2. A centimeter ruler for each student
3. An inch ruler with markings to the nearest quarter inch for each student
4. A list of ten items to measure in the classroom

Day 2:

1. Scales with markings to $^1/_2$ pound and kilogram
2. Various objects to weigh
3. A list of ten objects for each pair of students to weigh to the nearest pound and nearest kilogram

Culmination:

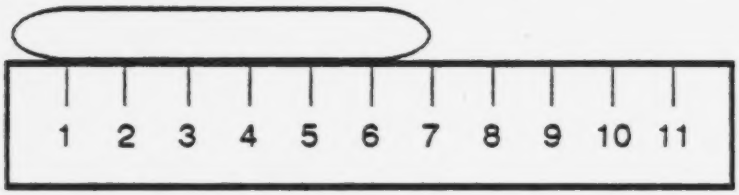
1. Three pictured centimeter rulers and three pictured inch rulers with quarter inch markings for each student. Objects should be drawn above each ruler.
2. Three pictured kilogram scales and three pictured pound scales with markings to the half pound for each student. Objects should be drawn above each scale.

Sample Tests

Test 1

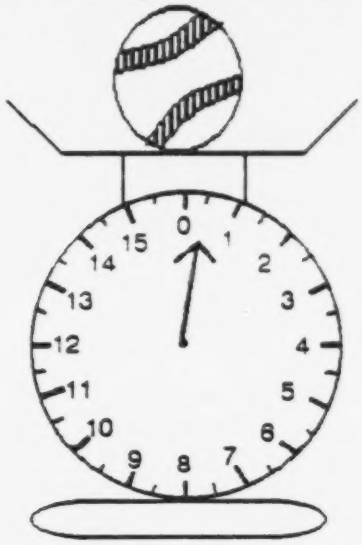
Directions: Follow the directions for each item. Mark your answer on the answer sheet.

1. Measure the length of the popsicle stick by using the pictured ruler.



(a) 7 centimeters
(b) 8 centimeters
(c) 9 centimeters
(d) 10 centimeters

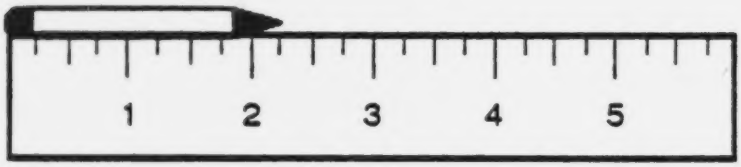
2. Measure the weight of the baseball by using the pictured scale.



(a) $\frac{1}{2}$ pound
(b) 0 pounds
(c) 1 pound
(d) $1\frac{1}{2}$ pounds

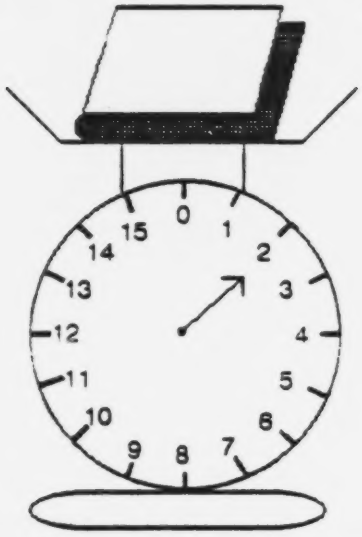
Test 1 (cont.)

3. Measure the length of the pencil by using the pictured ruler.



(a) $1\frac{3}{4}$ inches
(b) 2 inches
(c) $2\frac{1}{4}$ inches
(d) $2\frac{1}{2}$ inches

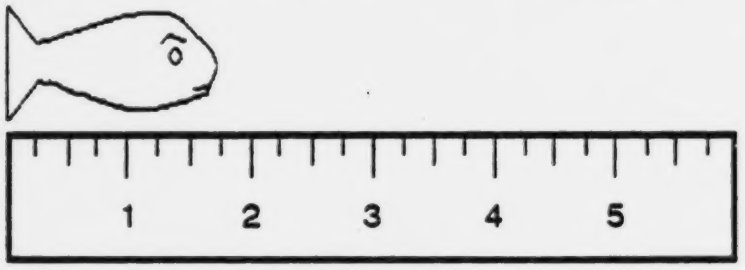
4. Measure the weight of the book by using the pictured scale.



(a) 1 kilogram
(b) 2 kilograms
(c) 3 kilograms
(d) 4 kilograms

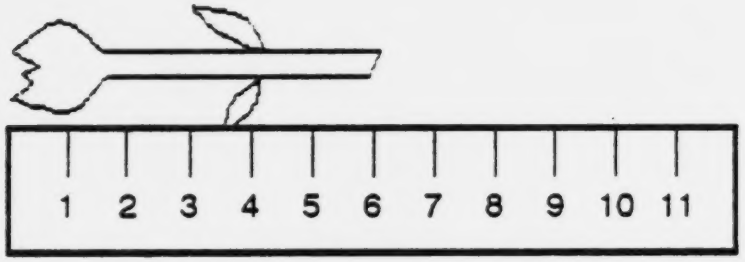
Test 1 (cont.)

5. Measure the length of the fish by using the pictured ruler.



(a) 1 inch
(b) $1\frac{1}{2}$ inches
(c) $1\frac{3}{4}$ inches
(d) 2 inches

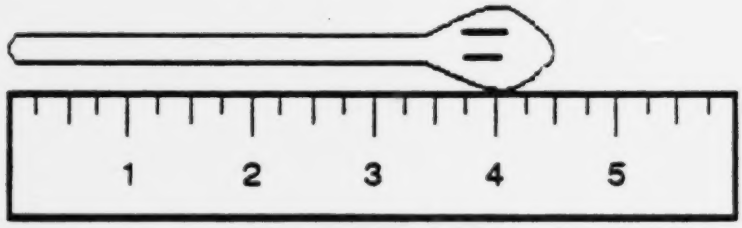
6. Measure the length of the flower by using the pictured ruler.



(a) 5 centimeters
(b) 6 centimeters
(c) 7 centimeters
(d) 9 centimeters

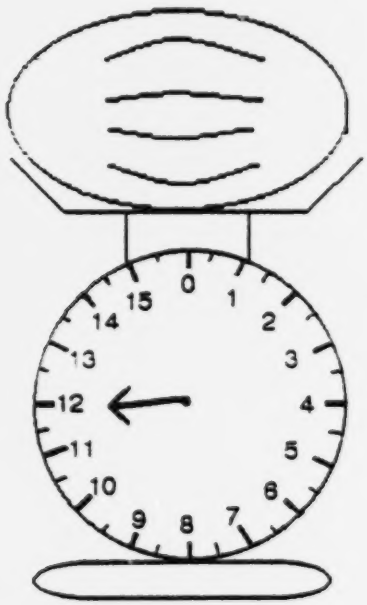
Test 1 (cont.)

7. Measure the length of the spoon by using the pictured ruler.



(a) 4 inches
(b) $4\frac{1}{2}$ inches
(c) $4\frac{3}{4}$ inches
(d) 5 inches

8. Measure the weight of the watermelon by using the pictured scale.



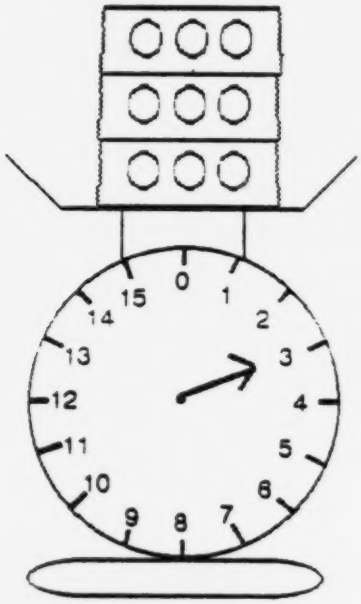
(a) 11 pounds
(b) 12 pounds
(c) $12\frac{1}{2}$ pounds
(d) 13 pounds

Test 1 (cont.)

9. Measure the length of the rubber band by using the pictured scale.

(a) 6 centimeters
(b) 7 centimeters
(c) 8 centimeters
(d) 9 centimeters

10. Measure the weight of the bricks by using the pictured scale.



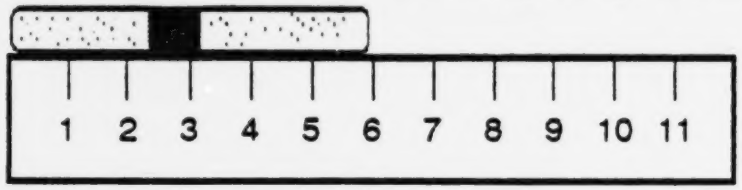
(a) 2 kilograms
(b) 3 kilograms
(c) 4 kilograms
(d) 5 kilograms

Sample Tests

Test 2

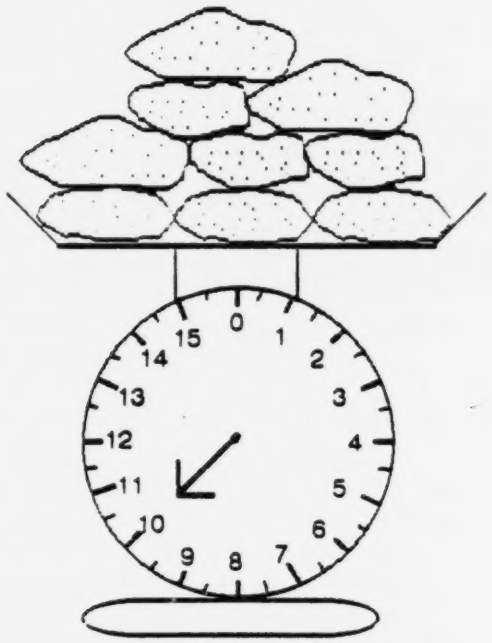
Directions: Follow the directions for each item. Mark your answer on the answer sheet.

1. Measure the length of the bandaid by using the pictured ruler.



(a) 3 centimeters
(b) 4 centimeters
(c) 5 centimeters
(d) 6 centimeters

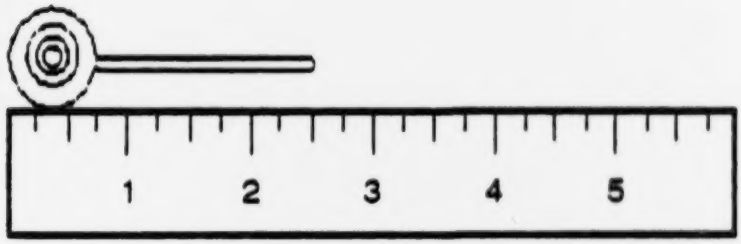
2. Measure the weight of the potatoes by using the pictured scale.



(a) $9\frac{1}{2}$ pounds
(b) 10 pounds
(c) $10\frac{1}{2}$ pounds
(d) 11 pounds

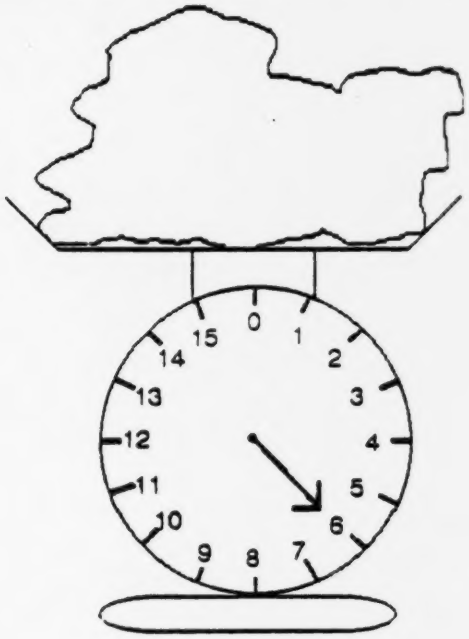
Test 2 (cont.)

3. Measure the length of the candy by using the pictured ruler.



(a) $1\frac{3}{4}$ inches
(b) 2 inches
(c) $2\frac{1}{4}$ inches
(d) $2\frac{1}{2}$ inches

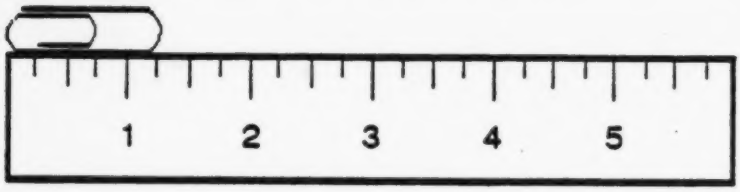
4. Measure the weight of the rock by using the pictured scale.



(a) 6 kilograms
(b) 5 kilograms
(c) 4 kilograms
(d) 3 kilograms

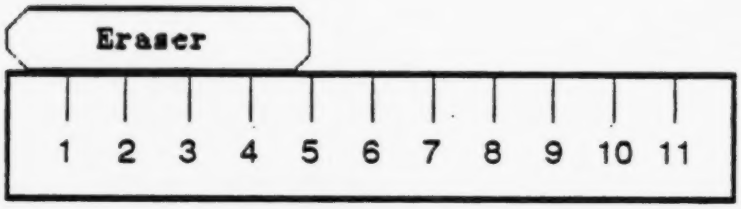
Test 2 (cont.)

5. Measure the length of the paper clip by using the pictured ruler.



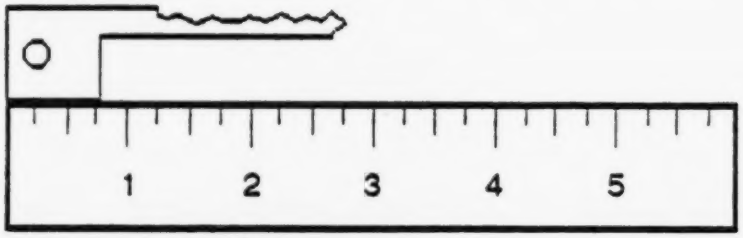
(a) $\frac{1}{2}$ inch
(b) $\frac{3}{4}$ inch
(c) 1 inch
(d) $1\frac{1}{4}$ inch

6. Measure the length of the eraser by using the pictured ruler.



(a) 4 centimeters
(b) 5 centimeters
(c) 6 centimeters
(d) 7 centimeters

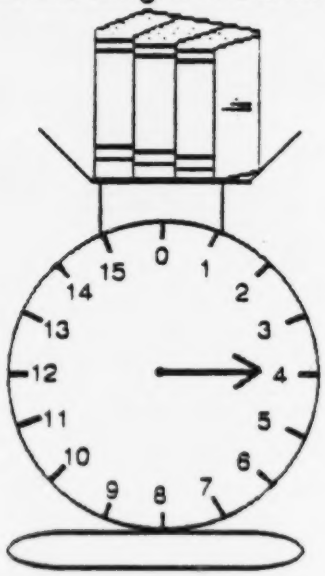
7. Measure the length of the key by using the pictured ruler.



(a) $2\frac{1}{2}$ inches
(b) $2\frac{3}{4}$ inches
(c) 3 inches
(d) $3\frac{1}{4}$ inches

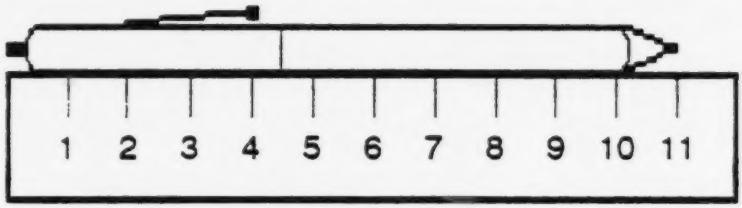
Test 2 (cont.)

8. Measure the weight of the books by using the pictured scale.



(a) 3 kilograms
(b) 4 kilograms
(c) 5 kilograms
(d) 6 kilograms

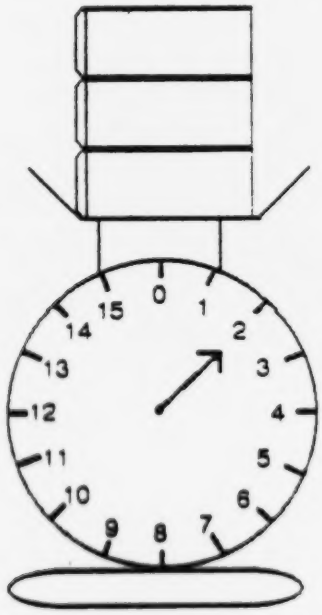
9. Measure the length of the ink pen by using the pictured scale.



(a) 11 centimeters
(b) 10 centimeters
(c) 9 centimeters
(d) 8 centimeters

Test 2 (cont.)

10. Measure the weight of the wood blocks by using the pictured scale.



(a) 1 kilogram
(b) 2 kilograms
(c) 3 kilograms
(d) 4 kilograms

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.16

Read temperature on Fahrenheit and Celsius scales.

Explanation of Objective

Read the temperature on a Fahrenheit or Celsius scale by matching the temperature shown on the thermometer with the correct reading. Thermometers should be marked in 5° intervals.

Prerequisite Skills (descending order)

(a) Recognize a thermometer with a Fahrenheit or Celsius scale and read the numbers on the thermometer.
(b) Skip count by 2's and 5's.

Vocabulary

temperature
thermometer
Fahrenheit
Celsius
scale

Lesson Plan Outline

Introduction:

Ask students if they know what instrument is used to measure temperature. Show them a Celsius thermometer and say that one way to measure temperature is with a Celsius thermometer to find degrees Celsius. Ask a student to read the temperature on the thermometer and write it on the board. For example, if it is 20 degrees Celsius, write 20° C stressing the necessity of using the symbols for degrees Celsius. Point out the boiling point (100° C) and the freezing point (0° C) of water. Discuss that each individual marking on a real thermometer stands for 2° C (Note: BSAP tests show thermometers marked in 5° intervals.) Give each student a Celsius thermometer marked in 5° intervals made from cardboard. Ask students what the outside temperature might be on certain days (e.g., a winter day, a summer day, etc.). Discuss the reasonableness of students' responses. When a reasonable temperature is agreed upon, have students show the temperature on their thermometers.

Activities:

Day 1:

1. Give pairs of students open-ended statements that require choosing a temperature to complete the statements accurately. For example: "You need to boil water to make hot tea. The temperature needed to boil water is 90° C or 100° C." Students should underline the correct response in each case and be prepared to support their choices. When students have completed this activity, discuss the correct responses and tell why the responses are reasonable.

2. Give pairs of students 10 pictured Celsius thermometers with each showing a different temperature (Thermometers should be marked in 5° intervals.) Have students record the temperatures and write some characteristics of days having those temperatures (e.g., A day with a temperature of 35° C would be hot and humid.) After students have completed the activity, have students demonstrate the various temperatures on their cardboard thermometers and explain their reasoning behind the characteristics they recorded for the days showing those temperatures.

Day 2:

1. Adapt the Introduction activity to introduce another way to measure temperature using the Fahrenheit scale. Use a real Fahrenheit thermometer and cardboard Fahrenheit thermometers marked in 5° intervals.

2. Extend Activity #1 Day 1 to include temperatures in degrees Fahrenheit.

3. Adapt Activity #2 Day 1 to include pictured Fahrenheit thermometers.

4. For 1 week: Have students record the temperature in degrees Celsius and degrees Fahrenheit daily at the same times each day (e.g., 9:00 a.m., 12:00 p.m., and 2:00 p.m.). At the end of the week, compare temperatures and identify the lowest and highest temperatures.

Culmination:

Give students 10 pictured thermometers - 5 showing Celsius temperatures and 5 showing Fahrenheit temperatures

Materials

Introduction:

1. A real Celsius thermometer

2. A cardboard Celsius thermometer marked in 5° intervals for each student

Day 1:

1. Open-ended statements that require students to choose a Celsius temperature to complete the statements accurately. For example: "A fall day might be 10° C or 40° C."

2. Ten pictured Celsius thermometers marked in 5° intervals with each showing a different temperature

3. A cardboard Celsius thermometer marked in 5° intervals for each student

Day 2:

1. A real Fahrenheit thermometer

2. A cardboard Fahrenheit thermometer marked in 5° intervals for each student

3. Open-ended statements that required students to choose a Fahrenheit temperature to complete the statement accurately. For example, "You want to wait for a warm day to go swimming. You should go when it is 20° F or 90° F."

4. Ten pictured Fahrenheit thermometers marked in 5° intervals with each showing a different temperature

Culmination:

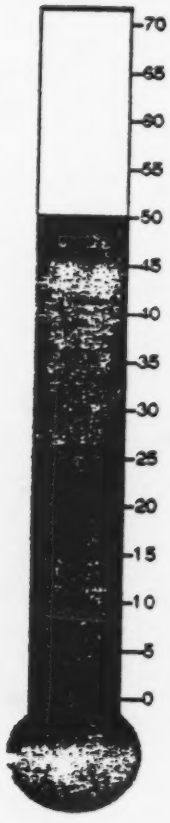
1. Ten pictured thermometers - 5 showing Celsius temperatures and 5 showing Fahrenheit temperatures for each student

Sample Tests

Test 1

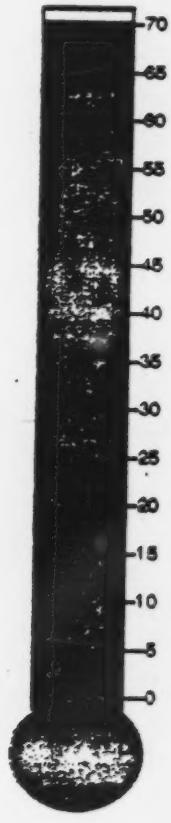
Directions: Read the temperature shown on the thermometer (Fahrenheit or Celsius). Mark your answer on the answer sheet.

1.



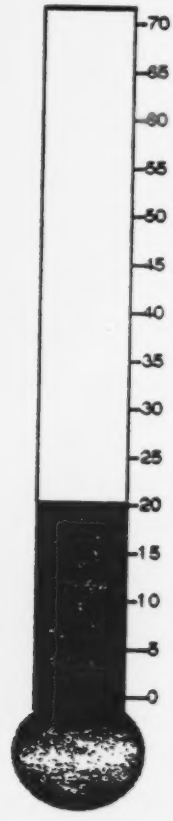
(a) 30° F
(b) 40° F
(c) 45° F
(d) 50° F

2.



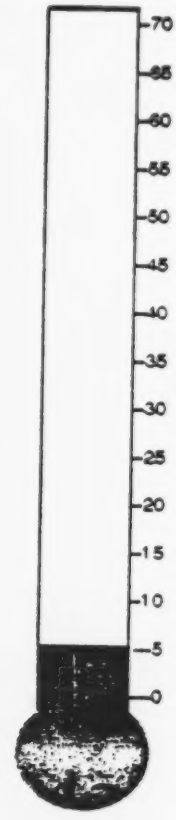
(a) 70° F
(b) 65° F
(c) 60° F
(d) 55° F

3.



(a) 10° C
(b) 15° C
(c) 20° C
(d) 25° C

4.



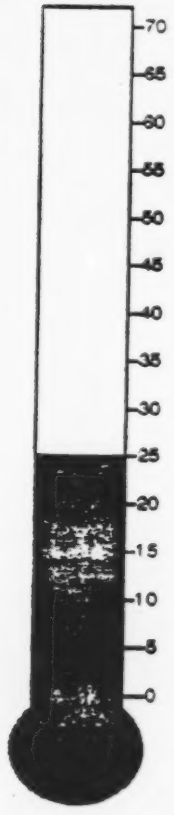
(a) 20° C
(b) 15° C
(c) 10° C
(d) 5° C

Test 1 (cont.)

5.

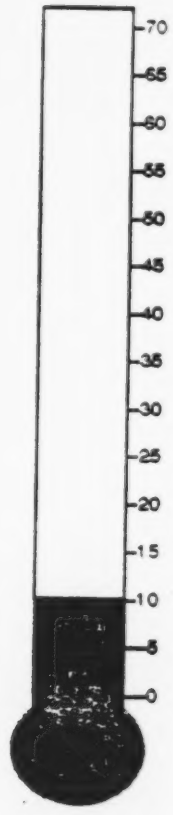
(a) 70° F
(b) 65° F
(c) 60° F
(d) 55° F

6.



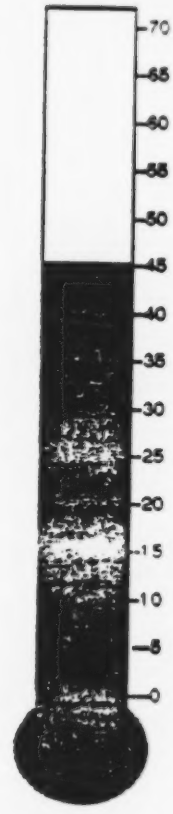
(a) 35° C
(b) 30° C
(c) 25° C
(d) 20° C

7.



(a) 20° C
(b) 15° C
(c) 10° C
(d) 5° C

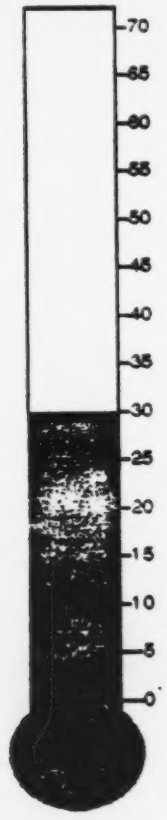
8.



(a) 45° F
(b) 40° F
(c) 35° F
(d) 30° F

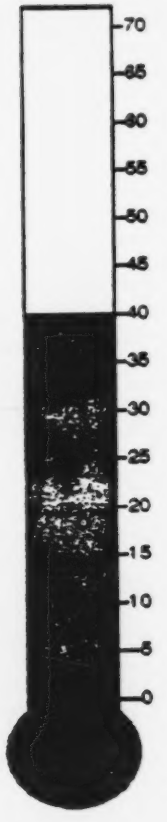
Test 1 (cont.)

9.



(a) 40° C
(b) 35° C
(c) 30° C
(d) 25° C

10.



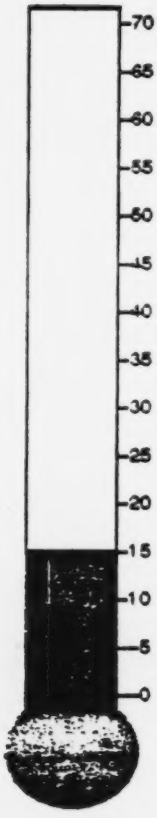
(a) 55° F
(b) 50° F
(c) 45° F
(d) 40° F

Sample Tests

Test 2

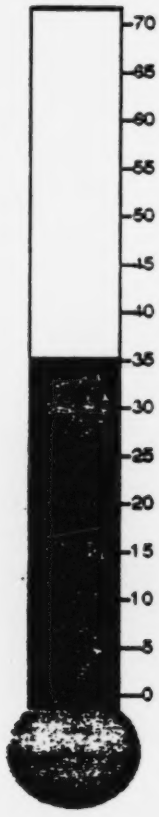
Directions: Read the temperature shown on the thermometer (Fahrenheit or Celsius). Mark your answer on the answer sheet.

1.



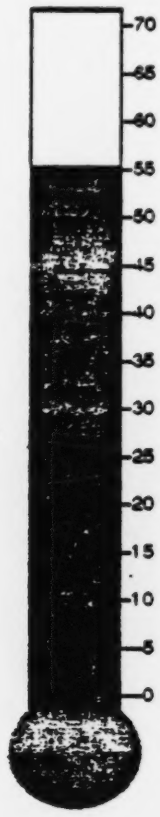
(a) 15° C
(b) 10° C
(c) 5° C
(d) 0° C

2.



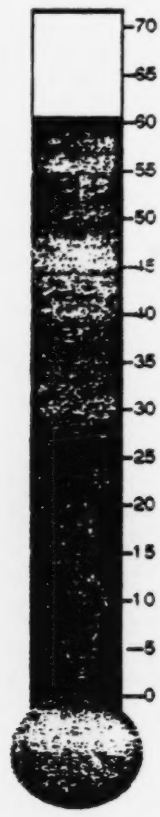
(a) 40° C
(b) 35° C
(c) 30° C
(d) 25° C

3.



(a) 65° F
(b) 60° F
(c) 55° F
(d) 50° F

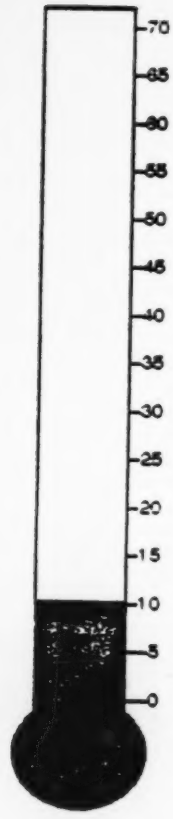
4.



(a) 70° F
(b) 65° F
(c) 60° F
(d) 55° F

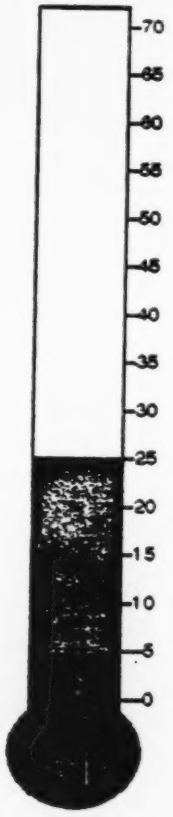
Test 2 (cont.)

5.



(a) 15° C
(b) 10° C
(c) 5° C
(d) 0° C

6.

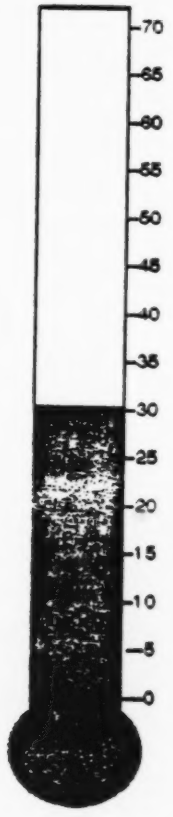


(a) 40° F
(b) 35° F
(c) 30° F
(d) 25° F

7.

(a) 45° F
(b) 40° F
(c) 35° F
(d) 30° F

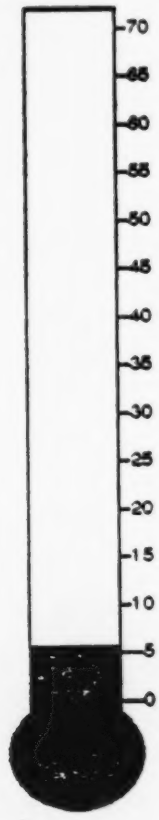
8.



(a) 45° C
(b) 40° C
(c) 35° C
(d) 30° C

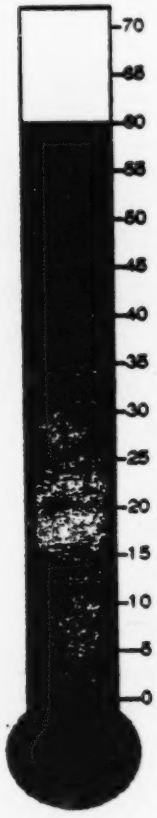
Test 2 (cont.)

9.



(a) 15° C
(b) 10° C
(c) 5° C
(d) 0° C

10.



(a) 60° F
(b) 55° F
(c) 50° F
(d) 45° F

Teaching Module (TM)

Mathematics Grade 5

Objective 5.17

Solve word problems involving whole numbers, using one operation.

Explanation of Objective

Solve one-step word problems involving whole numbers using one of the basic operations with or without regrouping. Each problem should have no more than four sentences. Addition problems may involve up to three addends, but addends should be less than 10,000. Subtraction problems may involve up to a three-digit minuend and a three-digit subtrahend that are less than 1,000 and require renaming of only 1 digit. Multiplication problems should have 2 factors of no more than 2-digits each. Division problems should have 1-digit divisors and no more than 3-digit dividends. No numbers should be included in the problem that are not needed in solving the problem.

Prerequisite Skills (descending order)

(a) Divide a three-digit number by a one-digit number with and without remainders.
(b) Multiply two-digit numbers, regrouping as necessary.
(c) Write horizontal two- and three-digit division, multiplication, subtraction, and addition number sentences in vertical form to solve.
(d) Subtract up to three-digit numbers with and without regrouping.
(e) Add up to three four-digit numbers with and without regrouping.
(f) **Master Objective 3.17 (i.e., Solve word problems involving while numbers, using one of the basic operations.).**

Vocabulary

add	multiplication
plus	divide
addition	divided by
subtract	division
minus	operation
subtraction	solve
multiply	times

Lesson Plan Outline

Introduction:

Write the following word problem on the board:

There were 1,546 girls in the park.
There were 392 boys in the park.
How many children in all?

Review the step-by-step problem-solving process used in TM 3.17 (Grade 3). Write the five steps of the process on the chalkboard in the following manner:

1. Read
2. Identify
3. Write
4. Solve
5. Check

Briefly explain the process as follows:

1. Read -- Read carefully.
2. Identify -- What are the important facts?
   What is the question?
   What operation is needed?
3. Write -- Write the number sentence.
4. Solve -- Solve the problem by completing the number sentence.
   Label the answer.
5. Check -- Rework the problem.
   Did you answer the question?
   Does the answer make sense? It is reasonable?

Tell the students that all five steps are extremely important and that they will learn how to perform each step. For now, however, emphasis will be placed on the first two steps. Demonstrate the use of the first two steps by applying them to the problem written on the board as shown below:

1. Read -- Read the problem aloud slowly and carefully.
2. Identify -- What are the important facts?
   1,546 girls
   392 boys
   What is the question?
   How many children in all?
   What operation is needed?
   Addition

Encourage students to look for key words such as "how many in all," " how many altogether," "how many more," "how many less," "how many are left," and "difference" to help them in selecting the appropriate operation. Also, demonstrate and encourage drawing pictures and/or using counters to help students in their understandings. Provide at least four other examples of the application of the first two steps. At this time, use only addition and subtraction problems. Do not write the number sentence or solve the problem. These last two steps will be emphasized later.

Activities:

Day 1:

1. Have pairs of students work together to identify the operation needed to solve ten addition and subtraction word problems. Problems are to be written on 3 x 5 cards with answers on the backs of the cards (Refer to Explanation of Objective for limitations in the construction of word problems.). Each student is to draw a card from the container and identify the operation needed to solve it. If his/her response is correct, he/she should explain the procedure he/she used in determining the response to the other student and keep the card until the end of the game. Students should continue in this manner until all of the cards have been drawn. The student with the most cards at the end of the day is the winner.

2. Write the ten word problems from Activity #1 Day 1 on the chalkboard. Check students' progress by having some of them come to the board and explain how they identified the appropriate operations.

Day 2:

1. Write the word problem used in the Introduction on the chalkboard. Review the application of the first two steps. After reviewing these steps, the board should look as follows:

There were 1,546 girls in the park.
There were 392 boys in the park.
How many children in all?

1. Read – Read carefully.
2. Identify – What are the important facts?
   1,546 girls
   392 boys
   What is the question?
   How many children in all?
   What operation is needed?
   Addition

Say that now that students have learned to perform the first two steps of the problem-solving process, the last three steps must be learned. Write the following under the steps already written on the board:

3. Write – Write the number sentence.
4. Solve – Solve the problem by completing the number sentence.
   Label the answer.
5. Check – Rework the problem.
   Did you answer the question?
   Does the answer make sense? Is it reasonable?

Ask students to consider the important facts identified in step #2 and decide which number sentence should be written. If students have difficulty in deciding where to begin, ask them to choose between the following two number sentences:

1,546 + 392 or 1,546 - 392

Then, step #3 on the board should look as follows:

3. Write – Write the number sentence.

$$1{,}546 + 392 = _____ \quad \text{or} \quad \begin{array}{r} 1{,}546 \\ +\ 392 \\ \hline \end{array}$$

Next, ask students to solve the problem by completing the number sentence and labeling the answer. Students may say that 1,938 is the answer. Say that 1,938 is the answer to 1,546 + 392, but that to be the answer to the problem it must be labeled as 1,938 children. Now, step #4 on the board should look as follows:

4. Solve – Solve the problem by completing the number sentence.

$$1{,}546 + 392 = 1{,}938 \quad \text{or} \quad \begin{array}{r} 1{,}546 \\ +\ 392 \\ \hline 1{,}938 \end{array}$$

Label the answer.
1938 children

Tell students that the problem-solving process is not complete until they perform step #5 -- checking the answer. In order to check, students should rework the problem, see if the answer makes sense and is reasonable. Step #5 on the board should look as follows:

5. Check – Rework the problem.
Did you answer the question?
Yes, 1,938 children
Does the answer make sense?
Yes
Is the answer reasonable?
Yes

Provide other examples of applying the five-step process to solve word problems. At this time, use only addition and subtraction word problems.

2. Have pairs of students work together to solve eight addition and subtraction word problems written on 3 x 5 cards (Refer to Explanation of Objective for limitations in the construction of word problems.). Additionally, if students had difficulty in deciding where to begin in writing the number sentences in the problems for Activity #1 Day 2,

give them extra help. Provide two number sentences from which to choose the correct number sentence. Then, have them find the answer to the number sentence they chose.

Day 3:

1. Adapt the introduction activity to introduce multiplication and division word problems (Refer to Explanation of Objective for limitations in the construction of word problems.). Briefly, review the five-step problem-solving process, but deal only with the first two steps at this time. Additionally, use only multiplication and division word problems at this time. Demonstrate and encourage drawing pictures and/or using counters to help students in understanding the problem.

2. Extend Activity #1 Day 1 to include ten multiplication and division word problems in the place of the addition and subtraction problems. Play the card game in the same manner.

3. Adapt Activity #2 Day 1 to include the ten multiplication and division word problems from Activity #2 Day 2 rather than the addition and subtraction problems.

Day 4:

1. Adapt Activity #1 Day 2 to introduce the application of the last three steps of the problem-solving process to multiplication and division word problems. Again, supply students with two number sentences from which to choose the correct sentence if they have difficulty.

2. Adjust Activity #2 Day 2 to include eight multiplication and division word problems rather than addition and subtraction problems.

Day 5:

1. Extend Activity #1 Day 1 to include 20 word problems. Five should be addition, five subtraction, five multiplication, and five division.

2. Adapt Activity #2 Day 1 to include all or some of the 20 word problems used in Activity #1 Day 5.

3. Extend Activity #2 Day 2 to include 16 word problems with four being addition, four subtraction, four multiplication, and four division. Each student within each pair of students should solve eight problems.

Culmination:

Check students' understanding by having each student solve five word problems which adhere to the limitations in the construction of objectives set forth in Explanation of Objective.

Materials

(Note: All word problems created for this module should adhere to the limitations in the construction of word problems set forth in the Explanation of Objective.)

Introduction:

1. Counters (optional)

2. Five addition and subtraction word problems to use as examples

Day 1:

1. Ten addition and subtraction word problems written on 3 x 5 cards for each pair of students

2. The ten addition and subtraction word problems described in Materials #1 Day 1

Day 2:

1. Addition and subtraction word problems to use as examples

2. Eight addition and subtraction word problems written on 3 x 5 cards for each pair of students

Day 3:

1. Counters (optional)

2. Five multiplication and division word problems to use as examples

3. Ten multiplication and division word problems written on 3 x 5 cards for each pair of students

4. The ten multiplication and division word problems described in Materials #3 Day 3

Day 4:

1. Multiplication and division word problems to use as examples

2. Eight multiplication and division word problems written on 3 x 5 cards for each pair of students

Day 5:

1. Twenty word problems with five being addition, five subtraction, five multiplication, and five division for each pair of students

2. The twenty word problems described in Materials #1 Day 5

3. Sixteen word problems with four being addition, four subtraction, four multiplication, and four division for each pair of students

Culmination:

1. Five word problems for each student

Examples of Word Problems to Use With Module

1. Karen had 129 dolls. Sue gave Karen 25 dolls and Sara gave Karen 51 dolls. How many dolls does Karen have now?

2. John's magazine has 112 pages. If he reads 16 pages each day, how many days will he need to read the entire magazine?

3. Mary's mother sewed 5 hours a day for 21 days. How many hours did she work?

4. There were 565 people at the fair on Tuesday. There were 334 people at the fair on Wednesday and 217 people on Thursday. How many people were at the fair on all three days?

5. Jim played 100 video games in 4 months. How many games did he play each month?

6. Tim had 67 posters. He gave Tommy 38 posters. How many posters did he have left?

7. If Ben works 11 hours each day for 32 days, how many hours will he work altogether?

8. Ellen gathered 196 eggs from the hen house. She dropped 77 eggs. How many eggs did she have left?

9. There were 924 people in the marching band. If there were 12 people in each row, how many rows were there?

10. There were 2,110 boys at camp. 656 went home. How many boys were still at camp?

Sample Tests

Test 1

Directions: Read the problem. Decide whether you should add, subtract, multiply, or divide. Solve the problem. You may use scratch paper. Mark your answer on the answer sheet.

1. A policeman worked 12 hours a day for 10 days. How many hours did he work?

(a) 22
(b) 120
(c) 2
(d) 100

2. There are 212 students in the fourth grade. There are 120 students in the fifth grade and 285 students in the sixth grade. How many students are in all three grades?

(a) 607
(b) 617
(c) 517
(d) 507

3. There are 345 seats in a school auditorium. One night, 228 people came to see the school play. How many empty seats were there that night in the auditorium?

(a) 117
(b) 573
(c) 563
(d) 127

4. The baseball team played 15 games the first month of the season, 17 games the second month, and 9 games the third month. How many games were played altogether?

(a) 31
(b) 32
(c) 41
(d) 26

5. A TV repairman repaired 135 television sets in 5 months. How many sets did he repair each month?

(a) 675
(b) 130
(c) 21
(d) 27

Test 1 (cont.)

6. There are 538 students that attend the school nearby. On Monday, 129 were absent. How many students were at school on Monday?

(a) 419
(b) 309
(c) 409
(d) 667

7. Bob has 238 baseball cards. Tom gives Bob 120 cards and Joe gives Bob 37 cards. How many cards does Bob have now?

(a) 395
(b) 385
(c) 118
(d) 315

8. Mary's book has 189 pages. She has 9 days to read it. How many pages should she read each day?

(a) 20
(b) 21
(c) 210
(d) 19

9. A rock star gets 67 fan letters each day. How many letters does he get in 30 days?

(a) 1,821
(b) 201
(c) 1,110
(d) 2,010

10. There were 343 cars in a parking lot. There were 7 cars in each row. How many rows of cars were there?

(a) 49
(b) 319
(c) 2,401
(d) 350

Test 2

Directions: Read the problem. Decide whether you should add, subtract, multiply, or divide. Solve the problem. You may use scratch paper. Mark your answer on the answer sheet.

1. A truck can carry 8 crates of oranges. How many truckloads are necessary to deliver 1000 crates of oranges?

(a) 8,000
(b) 133
(c) 125
(d) 117

2. There are 549 balls in boxes. There are 9 balls in each box. How many boxes are there?

(a) 61
(b) 511
(c) 51
(d) 601

3. Tom had 767 bottle caps. He lost 182. How many bottle caps did he have left?

(a) 685
(b) 575
(c) 675
(d) 585

4. Sue drove 613 miles on Monday, 592 miles on Tuesday, and 320 miles on Wednesday. How many miles did she drive altogether?

(a) 1,425
(b) 1,525
(c) 1,512
(d) 15,125

5. Ron practiced playing the piano 432 hours in 6 months. How many hours did he practice each month?

(a) 610
(b) 72
(c) 61
(d) 702

Test 2 (cont.)

6. There were 939 members in a dance club. 42 members dropped out of the club. How many members were left?

(a) 897
(b) 997
(c) 887
(d) 977

7. Kay has 2,355 rings. Jan gives her 27 rings. How many rings does she have now?

(a) 2,372
(b) 23,712
(c) 2,328
(d) 2,382

8. Jane planted 85 flowers in her garden. There were 5 flowers in each row. How many rows were there in the garden?

(a) 165
(b) 80
(c) 17
(d) 425

9. Bill can put together 5 puzzles each day. How many puzzles can he put together in 170 days?

(a) 175
(b) 850
(c) 165
(d) 5,350

10. There are 125 students in the first grade. There are 115 students in the second grade and 135 students in the third grade. How many students are in all three grades?

(a) 365
(b) 3,165
(c) 355
(d) 375

Teaching Module (TM)

Mathematics - Grade 5

Objective 5.18

Solve word problems involving whole numbers, using two operations.

Explanation of Objective

Identify the sequence of operations needed to solve a given word problem involving two operations. Only one-, two-, or three-digit numbers may be used. Problems should not be longer than four sentences.

Prerequisite Skills (descending order)

(a) **Master Objective 3.17 (i.e., Solve word problems involving whole numbers, using one of the basic operations.).**
(b) **Master Objective 5.17 (i.e., Solve word problems involving whole numbers, using one operation.).**

Vocabulary

solve	subtraction
operation	multiply
add	times
plus	multiplication
addition	divide
subtract	divided by
minus	division

Lesson Plan Outline

Introduction:

Write the following word problem on the board:

> Mary had 62 baseball cards. She gave Bob 11 cards, Tom 19 cards, and Sam 6 cards. How many cards did she have left?

Ask students how this word problem differs from those they have solved in the past. Tell students that instead of identifying and performing one operation – addition, subtraction, multiplication, or division – two operations will have to be identified and performed in order to find the solution. Review the step-by-step problem-solving process used in TM 3.14, TM 3.17, and TM 5.17. Write the five steps of the process on the chalkboard in the following manner:

1. Read
2. Identify
3. Write
4. Solve
5. Check

Briefly explain the process as follows:

1. Read – Read carefully.
2. Identify – What are the important facts?
   What operations are needed?
3. Write – Write the number sentence.
4. Solve – Solve the problem by completing the number sentence.
   Label the answer.
5. Check – Rework the problem.
   Did you answer the question?
   Does the answer make sense? It is reasonable?

Tell the students that all five steps are extremely important and that they will learn how to perform each step. For now, however, emphasis will be placed on the first two steps. Demonstrate the use of the first two steps by applying them to the problem written on the board as shown below:

1. Read – Read the problem aloud slowly and carefully.
2. Identify – What are the important facts?
   Mary had 62 baseball cards.
   Gave Bob 11 cards, Tom 19 cards, and Sam 6 cards.
   What is the question?
   How many cards did she have left?
   What operations are needed?
   Addition, then subtraction

Ask students why adding the cards given to Bob, Tom, and Sam before subtracting was more practical than subtracting three times beginning with 62 (i.e., 62 - 11 = a; a - 19 = b; b - 6 = c). To help students further their understandings, demonstrate and encourage drawing pictures and/or using counters. Provide at least four other examples of the application of the first two steps. The last three steps will be emphasized later.

Activities:

Day 1:

1. Have pairs of students work together to identify the operations needed to solve ten word problems. Problems are to be written on 3 x 5 cards with answers on the backs of the cards (Refer to Explanation of Objective for limitations in the construction of word problems.). Each student is to draw a card from the container and identify the operations needed to solve it. If his/her response is correct, he/she should explain the

procedure he/she used in determining the response to the other student and keep the card until the end of the game. Students should continue in this manner until all of the cards have been drawn. The student with the most cards at the end of the game is the winner.

2. Write the ten word problems from Activity #1 Day 1 on the chalkboard. Check students' progress by having some of them come to the board and explain how they identified the appropriate operations.

Day 2:

1. Repeat Activity #1 Day 1 but use ten different word problems and have different students work together.

2. Repeat Activity #2 Day 1 but use the ten word problems from Activity #1 Day 2.

***Mastery of this objective on the BSAP requires knowledge of the first two steps of the problem-solving process. The last three steps are not tested on the BSAP. However, they are covered in this module and will be addressed from this point following.**

Day 3:

1. Write the word problem used in the Introduction on the chalkboard. Review the application of the first two steps. After reviewing these steps, the board should look as follows:

Mary had 62 baseball cards. She gave Bob 11 cards, Tom 19 cards, and Sam 6 cards. How many cards did she have left?

1. Read – Read carefully.
2. Identify – What are the important facts?
   Mary had 62 baseball cards.
   Gave Bob 11 cards, Tom 19 cards, Sam 6 cards.
   What is the question?
   How many cards did she have left?
   What operations are needed?
   Addition, then subtraction

Say that now that students have learned to perform the first two steps of the problem-solving process, the last three steps must be learned. Write the following under the steps already written on the board:

3. Write – Write the number sentences.
4. Solve – Solve the problem by completing the number sentence.
   Label the answer.
5. Check – Rework the problem.

Did you answer the question?
Does the answer make sense? Is it reasonable?

Ask students to consider the important facts identified in step #2 and decide which number sentence should be written for the first operation, addition, that must be performed. Then, solve the addition number sentence and decide which number sentence should be written for the second operation, subtraction, that must be performed. Solve the subtraction number sentence. Then, steps #3 and #4 on the board should look as follows:

3. Write – Write the number sentences.
4. Solve – Solve the problem by completing the number sentence.

Addition:
$$\begin{array}{r} 11 \\ 19 \\ +\ 6 \\ \hline 36 \end{array}$$

Subtraction:
$$\begin{array}{r} 62 \\ -\ 36 \\ \hline 26 \end{array}$$

Label the answer.
26 baseball cards

Tell students that the problem-solving process is not complete until they perform step #5 -- checking the answer. In order to check, students should rework the problem and see if the answer makes sense and is reasonable. Step #5 on the board should look as follows:

5. Check -- Rework the problem.
Did you answer the question?
Yes, 26 baseball cards
Does the answer make sense?
Yes
Is the answer reasonable?
Yes

Provide other examples of applying the five-step process to solve two-step word problems.

2. Extend Activity #1 Day 1 by using the same ten word problems and having students apply the entire five-step process.

3. Have students demonstrate on the board the solving of the two-step word problems used in Activity #2 Day 3.

Culmination:

Check students' understanding by having each student solve five word problems which adhere to the limitations in the construction of objectives set forth in Explanation of Objective.

Materials

(Note: All word problems created for this module should adhere to the limitations in the construction of word problems set forth in the Explanation of Objective.)

Introduction:

1. Counters (optional)

Day 1:

1. Ten word problems written on 3 x 5 cards for each pair of students

Day 2:

1. Ten word problems different from those used in Day #1 written on 3 x 5 cards for each pair of students

Day 3:

1. The ten word problems described in Materials #1 Day 1

Culmination:

1. Five word problems for each student

Examples of Word Problems to Use With Module

1. A service station worker on the east side of town pumps 52 gallons of gas every hour. Another service station worker on the west side pumps 38 gallons of gas every hour. What is the total number of gallons of gas pumped by both workers in 6 hours?

2. Joe sold 12 boxes of candy bars with 10 candy bars in each box. Jim sold 8 boxes of candy bars with 13 candy bars in each box. How many more candy bars did Joe sell than Jim?

3. Lisa had 65 stamps. She gave Meg 15 stamps, Randy 3 stamps, and Chris 32 stamps. How many stamps did she have left?

4. Pam bought 68 apples. She baked 22 on Wednesday and the rest of Thursday. Each apple had to bake for 30 minutes. How much time did she spend baking on Thursday?

5. Ken had to read 72 short stories by Wednesday. He read 26 on Monday and 18 on Tuesday. How many short stories does he have left to read on Wednesday?

6. Karen gave Lee 12 bags of marbles. There were 21 marbles in each bag. Lee lost 8 marbles. How many marbles did he have left?

7. Mary collects black and white rocks. She has three times as many rocks as Bob. Bob has 44 black rocks and 17 white rocks. How many rocks does Mary have?

8. There were 9 rows of flowers in Terri's garden with 12 flowers in each row. Terri planted 5 more rows of flowers with 8 flowers in each row. How many flowers were in Terri's garden altogether?

9. Andy eats 225 cookies each month. He wants to buy enough cookies for 5 months. If a box holds 25 cookies, how many boxes will Andy need to buy?

10. Jane had 430 ribbons. She gave 125 away and divided the rest equally among 5 boxes. How many ribbons did Jane put in each box?

Sample Tests

Test 1

Directions: Read the problem. Choose the correct order of operations needed to solve the problem. Mark your answer on the answer sheet.

1. An ice cream truck on the south side of town sells 15 ice cream cones every hour. Another ice cream truck on the north side of town sells 26 ice cream cones every hour. What is the total number of ice cream cones sold by both trucks in 8 hours?

(a) multiply, then subtract
(b) subtract, then multiply
(c) multiply, then add
(d) divide, then add

2. Lee had 852 rocks. He gave 177 rocks away and divided the rest equally among 5 boxes. How many rocks did Lee put in each box?

(a) subtract, then divide
(b) add, then divide
(c) subtract, then multiply
(d) add, then multiply

3. Mary had 59 golf balls. She gave Bill 9 balls, Ted 20 balls, and Sue 5 balls. How many balls did she have left?

(a) subtract, then add
(b) add, then subtract
(c) multiply, then subtract
(d) add, then divide

4. A store sold 15 crates of oranges with 36 oranges in each crate and 11 crates of melons with 6 melons in each crate. How many more oranges than melons did the store sell?

(a) multiply, then subtract
(b) add, then multiply
(c) multiply, then divide
(d) subtract, then multiply

5. John bought 42 tomato plants. He planted 19 on Monday and the rest on Tuesday. It took him 5 minutes to plant each one. How much time did he spend planting on Tuesday?

(a) add, then multiply
(b) divide, then multiply
(c) multiply, then divide
(d) subtract, then multiply

Test 1 (cont.)

6. Kay had 25 rows of rose bushes with 5 rose bushes in each row. 11 rose bushes died. How many rose bushes did she have left?

(a) add, then subtract
(b) multiply, then subtract
(c) divide, then subtract
(d) subtract, then add

7. Joe eats 12 apples each week. He wants to buy enough apples for 6 weeks. If a crate holds 36 apples, how many crates will Joe need to buy?

(a) divide, then multiply
(b) add, then multiply
(c) multiply, then divide
(d) subtract, then divide

8. Jan drove 432 miles on Monday, 388 miles on Tuesday, and 262 miles on Wednesday. If her entire trip is 1500 miles, how many miles does she have left to drive on Thursday?

(a) add, then subtract
(b) add, then multiply
(c) subtract, then divide
(d) divide, then add

9. Kim gave Bob 13 boxes of candy. There were 10 pieces of candy in each box. Bob ate 21 pieces of candy. How many pieces of candy did he have left?

(a) add, then subtract
(b) add, then divide
(c) multiply, then subtract
(d) subtract, then multiply

10. There were 16 rows of cars in a parking lot with 7 cars in each row. 2 more rows of cars with 6 cars in each row were added. How many cars were in the parking lot altogether?

(a) add, then subtract
(b) multiply, then divide
(c) multiply, then subtract
(d) multiply, then add

Sample Tests

Test 2

Directions: Read the problem. Choose the correct order of operations needed to solve the problem. Mark your answer on the answer sheet.

1. In 1986, Tom weighed 104 pounds. He gained 10 pounds in 1987 and 12 pounds in 1988. He lost 7 pounds in 1989. How much does he weigh now?

(a) subtract, then multiply
(b) add, then subtract
(c) multiply, then divide
(d) multiply, then add

2. Mr. Jones sold 22 hamburgers each day for 11 days. On the twelfth day, he sold 18 hamburgers. How many hamburgers did he sell altogether?

(a) multiply, then add
(b) multiply, then subtract
(c) add, then multiply
(d) add, then subtract

3. Betty had 112 dolls. She gave 12 dolls away and placed the rest on 10 shelves. If she placed an equal number on each shelf, how many dolls would be put on each shelf?

(a) subtract, then multiply
(b) add, then divide
(c) multiply, then divide
(d) subtract, then divide

4. Rita had 60 cupcakes. She ate 5 cupcakes and gave 11 to Mark and 18 to Mike. How many cup cupcakes did she have left?

(a) subtract, then divide
(b) add, then subtract
(c) add, then multiply
(d) multiply, then add

5. A store sold 137 boxes of paper clips and 75 boxes of rubber bands. A box holds 51 paper clips and 41 rubber bands. How many more paper clips than rubber bands did the store sell?

(a) multiply, then subtract
(b) add, then multiply
(c) multiply, then divide
(d) subtract, then multiply

Test 2 (cont.)

6. Stan had 32 thank you notes to write. He wrote 12 on Friday and the rest on Saturday. It took him 7 minutes to write each one. How much time did he spend writing on Saturday?

(a) add, then multiply
(b) divide, then multiply
(c) multiply, then divide
(d) subtract, then multiply

7. Jim swam 16 laps in a swimming pool in 32 minutes on Monday. On Tuesday, Jim wants to swim 21 laps in the pool. How many minutes will it take Jim to swim on Tuesday?

(a) divide, then add
(b) divide, then multiply
(c) multiply, then subtract
(d) add, then subtract

8. Cindy gave Rob 11 bowls of fruit. There were 9 pieces of fruit in each bowl. Rob ate 7 pieces of fruit. How many pieces of fruit did he have left?

(a) add, then subtract
(b) multiply, then divide
(c) multiply, then subtract
(d) subtract, then multiply

9. There were 15 rows of band members in the marching band with 8 members in each row. 3 more rows of band members with 4 members in each row were added. How many band members were in the marching band altogether?

(a) add, then subtract
(b) multiply, then divide
(c) multiply, then subtract
(d) multiply, then add

10. Tim ran 12 miles on Thursday, 22 miles on Friday, and 18 miles on Saturday. If he wants to run a total of 60 miles by Sunday, how many miles does he have left to run?

(a) add, then subtract
(b) add, then multiply
(c) subtract, then divide
(d) divide, then add

Objective 5.19

Solve word problems involving money, using addition and subtraction.

Explanation of Objective

Solve word problems involving money where each problem involves no more than one step, either addition or subtraction, and numbers are no larger than 3 digits. Addition problems should have no more than 3 addends.

Prerequisite Skills (descending order)

(a) **Master Objective 3.14 (i.e., Make change up to one dollar by solving simple word problems.)**

Vocabulary

add
addition
solve
subtract
subtraction
words used in word problems

Lesson Plan Outline

Introduction:

Write the following word problem on the board:

Sue earned $1.50 helping her mother. She spent $1.29 for a ribbon. How much money does she have left?

Ask students what must be done first before this problem can be solved. Review the problem-solving process from TM 3.14, and 3.17, 5.17, and 5.18. Write the five steps of the process on the board as follows:

1. Read
2. Identify
3. Write
4. Solve
5. Check

Refer to the problem written on the board. Apply the problem-solving process to it to find the solution. First, read the problem aloud. Next, ask students to identify the question asked and the important facts needed to solve the problem. Ask what operation does the question imply? Write "subtraction" on the board. Say that when you have a certain amount of money and you spend some of it, you will always subtract to find out how much change you have left. You will always be left with less money than you had in the beginning. Then, ask someone to tell the subtraction number sentence needed to solve this problem. Write the following on the board:

$1.50 - $ 1.29 = or

$$\begin{array}{r} \$1.50 \\ -\ \$1.29 \\ \hline \end{array}$$

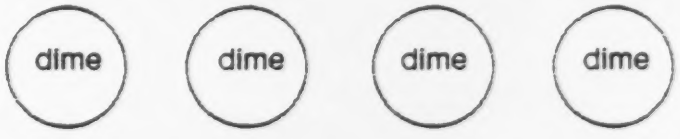
Give a student $1.50 in play money, have him/her find answer problem and show the amount left. Explain the necessity of labeling the answer (i.e., using a dollar sign or a cents sign, but not both to label the answer). Additionally, stress the necessity of checking the answer. Rework the problem to check. Show students how to use addition (i.e., adding the difference and the subtrahend together to see if the answer is the minuend) to check. Also, emphasize that in order for an answer to be correct it must make sense and be reasonable. Write other similar problems (both addition and subtraction on the board, apply the problem-solving process, and find the solution.

Activities:

Day 1:

1. Provide students with ten word problems written on 3 x 5 cards (Refer to the Explanation of Objective for criteria in construction of word problems.). Have pairs of students work together to find the solutions. Both students should solve five problems each. They should use play money to help in finding the solutions. Additionally, students should write the number sentences in vertical form, label and check the answers. When each has completed his/her five problems, he/she should explain to the other the step-by-step process used to find the solutions.

2. When students have completed Activity #1 Day 1, have each set of partners make a list of their ten answers. For each answer, students should write at least four different ways the amount of money can be represented with coins and, in turn, draw the coins needed. For example, if an answer is 40¢, a student may write 4 dimes = 40¢ and draw:



Students may use play money for assistance.

Day 2:

1. Have pairs of students play Tic Tac Toe using ten word problems written on 3 x 5

cards (Refer to Explanation of Objective for criteria in construction of word problems.). The correct solutions to the problems should be written on the backs of the cards so that students may check their answers. The first player should draw a card, solve the problem, check the answer, explain to the other player how the solution was found, and if the solution is correct, place an X or O card in a square on the Tic Tac Toe board (the X and O cards should be the same size as the squares on the Tic Tac Toe board.). If the solution is incorrect, the card should be returned to the draw pile. Then, the second player has a turn. The winner is the first player to get three X's or three O's in a row, column, or diagonal. Students may use play money for assistance.

2. Have students switch partners and play Tic Tac Toe as in Activity #1 Day 2. Use a different set of word problems.

Day 3:

1. Have students play store to practice adding and subtracting money values. Have three storekeepers. The other students should be given a word problem card (Refer to Explanation of Objective for criteria in construction of word problems). If the word problem is an addition problem, students should add the amounts of the items being purchased, get the exact amount of play money needed to purchase the items, and give their money to one of the storekeepers. The storekeeper should check to see that the buyer is giving the correct amount of money. No change should be given. If the word problem is a subtraction problem, it should read similar to the following;

You have $3.73. If you bought an item for $2.16, how much change would you get?

Each student should get the amount of play money his/her card says that he/she has. Then, go to the store, purchase an item for the amount on the card, and give his/her money to one of the storekeepers. The storekeepers are to give each his/her appropriate change. Each student receiving change should use play money to see if the amount of change given is correct. Additionally, each student should check the amount of change by writing the corresponding number sentence and subtracting. If the amount of change is incorrect, he/she should go back to the storekeeper, and have him/her give the correct change.

2. After students have completed Activity #1 Day 3, repeat the activity using different students as storekeepers.

Culmination:

Check students' understanding by having each student solve five word problems which adhere to the limitations in the construction of word problems set forth in the Explanation of Objective.

Materials:

(Note: All word problems created for this module should adhere to the limitations for

construction of word problems set forth in the Explanation of Objective.)

Introduction:

1. Several word problems to use as examples on the chalkboard

2. Play money

Day 1:

1. Ten word problems written on 3 x 5 cards for each pair of students

2. Play money for each pair of students

3. Blank paper for each student

Day 2:

1. One Tic Tac Toe board duplicated onto paper for each pair of students

Example:

Tic	Tac	Toe

2. Approximately six X cards and six O cards the same size as the squares on the Tic Tac Toe board for each pair of students

3. Twenty word problems written on 3 x 5 cards for each pair of students - ten for Activity #1 Day 2 and ten for Activity #2 Day 2

4. Play money for each pair of students

Day 3:

1. One word problem card for each student similar to the following:

You have $5.37 and buy an item for $1.43. How much much change will you get?

2. A make-believe store with items for purchase whose prices reflect the amounts of money students should spend as designated by their word problem cards

3. Play money for each student and for the storekeepers

Culmination:

1. Five word problems for each student

Examples of Word Problems to Use With Module

1. Melanie's mother wanted to make a dress. She spent $8.43 for materials and $2.33 for thread. How much did she spend altogether?

2. Tom earned $5.65 selling tickets on Tuesday and $3.88 on Wednesday. How much did he earn altogether?

3. A cake costs $9.58. A pie costs $5.49. How much more does the cake cost than the pie?

4. Ann had $7.76. She bought a book for $4.57. How much money did she have left?

5. Diane had $5.00. Her mother gave her $2.59. How much money does she have now?

6. Lynn earned $6.33 washing cars. Ben earned $7.81. How much more did Ben earn than Lynn?

7. Billy wants to buy a ball for $6.68 and a bat for $8.98. How much money does he need to buy both the ball and the bat?

8. Sara got $1.34 from her mother, $3.37 from her father, and $2.20 from her brother. How much money does she have now?

9. Bill spent $.62 for a snack on Friday, $.54 on Saturday, and $1.23 on Sunday. How much did he spend?

10. Dan wants to buy a water gun for $5.56. He has $3.77. How much money does he need?

Test 1

Directions: Read and solve the problem. You may use scratch paper. Mark your choice on the answer sheet.

1. Joe earned $8.00 mowing lawns. He spent $5.45 for a game. How much money does he have left?

(a) $3.65
(b) $3.55
(c) $2.65
(d) $2.55

2. Sue wanted to plant a garden. She spent $7.25 for seeds and $1.83 for fertilizer. How much money did she spend altogether?

(a) $9.08
(b) $9.02
(c) $8.08
(d) $6.02

3. Sara bought a hamburger for $1.20, fries for $.55, and a drink for $.60. How much did she spend altogether?

(a) $2.45
(b) $2.35
(c) $1.45
(d) $1.35

4. John wants to buy a soccer ball for $8.19. He has $6.48. How much more money does he need?

(a) $2.71
(b) $2.31
(c) $1.71
(d) $1.31

5. Sam paid $6.50 for a ticket to the circus on Thursday. Tom paid $7.25 for a ticket to the circus on Friday. How much more did Tom pay for a ticket than Sam?

(a) $ .75
(b) $1.75
(c) $1.35
(d) $ .35

Test 1 (cont.)

6. Jane had $4.43. She gave a store clerk $1.29 for a balloon. How much change did she get?

(a) $3.26
(b) $3.24
(c) $3.14
(d) $2.14

7. Bob earned $2.55 for selling lemonade on Monday and $6.92 for selling lemonade on Tuesday. How much money did he earn altogether?

(a) $10.47
(b) $ 9.47
(c) $ 8.47
(d) $ 8.43

8. A book costs $1.95. A kite costs $ .98. How much more does the book cost then the kite?

(a) $ .87
(b) $ .93
(c) $1.07
(d) $ .97

9. Tim wants to buy a shirt for $7.25 and a belt for $3.56. How much money does he need to buy both the shirt and the belt?

(a) $ 4.31
(b) $ 4.81
(c) $10.71
(d) $10.81

10. Nick had a $5.00 bill. He bought a candy bar for $.45. How much change did he get back?

(a) $4.65
(b) $4.55
(c) $5.65
(d) $5.45

Sample Tests

Test 2

Directions: Read and solve the problem. You may use scratch paper. Mark your choice on the answer sheet.

1. Jim earned $9.50 delivering papers. He spent $3.67 for cookies. How much money does he have left?

(a) $6.73
(b) $6.83
(c) $5.73
(d) $5.83

2. Sally wanted to knit a sweater. She spent $6.57 for yarn and $2.81 for needles. How much money did she spend altogether?

(a) $9.38
(b) $9.36
(c) $8.38
(d) $8.36

3. Jason bought a knife for $5.75, sunglasses for $4.00, and socks for $2.16. How much money did she spend altogether?

(a) $ 7.81
(b) $11.91
(c) $11.81
(d) $11.61

4. Mary wants to buy a doll for $3.79. She has $2.56. How much money does she need?

(a) $ .23
(b) $1.13
(c) $1.23
(d) $5.23

5. Jan paid $3.28 for one pound of hamburger meat on Monday. Bob paid $2.88 for one pound of hamburger meat on Tuesday. How much more did Jan pay for the meat than Bob?

(a) $ .40
(b) $ .60
(c) $1.40
(d) $1.60

Test 2 (cont.)

6. Andy had $5.72. He gave a store clerk $2.44 for candy. How much change did he get?

(a) $2.28
(b) $3.32
(c) $3.28
(d) $3.38

7. Ann earned $3.61 for selling flowers on Monday and $1.49 for selling flowers on Tuesday. How much money did she earn altogether?

(a) $4.00
(b) $5.10
(c) $5.00
(d) $4.10

8. An apple costs $.57. A grapefruit costs $.49. How much more does the apple cost than the grapefruit?

(a) $ .18
(b) $ .16
(c) $ .96
(d) $ .08

9. Susie wants to buy a blouse for $8.59 and a bow for $1.52. How much money does she need to buy both the blouse and the bow?

(a) $ 7.07
(b) $ 9.07
(c) $ 9.11
(d) $10.11

10. Anna had a $1.00 bill. She bought some gum for $.66. How much change did she get back?

(a) $ .24
(b) $ .34
(c) $ .44
(d) $ .46

Objective 5.20

Interpret bar groups, pictographs, or circle graphs.

Explanation of Objective

Interpret horizontal or vertical bar graphs with a scale of 0 - 10 with all numbers labeled or 0 - 100 with all multiples of 10 labeled. The bars should not fall between two labeled lines. Interpret pictographs where the symbol or key stands for less than 10 and the question to be answered requires a number answer. Interpret circle graphs where the parts of the graph are labeled with words or words and whole numbers, but not with percents or fractions. The circle graph interpretation should involve questions concerning the largest or smallest division only.

Prerequisite Skills (descending order)

(a) Recognize bar graphs, pictographs, and circle graphs.

Vocabulary

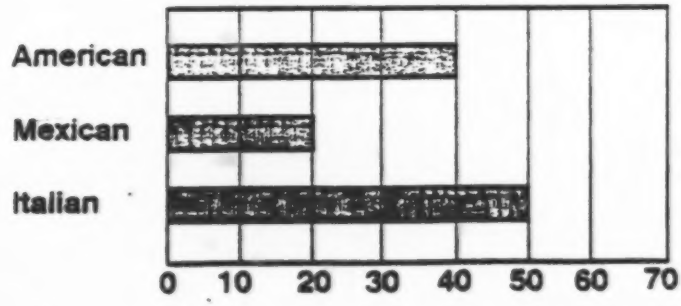
graph
bar graph
circle graph
pictograph
interpret

Lesson Plan Outline

Introduction:

Draw the following bar graph on the board:

Favorite Types of Food of Fifth-Grade Students



Ask students to study what was drawn on the board as you read the following paragraph aloud: The fifth graders at one school chose their favorite type of food from three types of food. 40 students chose American food. 20 students chose Mexican food and 50 students chose Italian food. Ask students if the drawing on the board and the paragraph read mean the same. Tell students that the drawing is called a bar graph. Ask why the drawing is called by that name. Say that bar graphs are a good way to show and compare information. Ask students to answer other interpretive questions from the bar graph on the board. Point out that the bar graph is called a horizontal bar graph because the bars are drawn from left to right. Then, draw a vertical bar graph showing the same information and ask students why the graph is called a vertical bar graph. Draw other horizontal and vertical bar graphs on the bar and have students answer questions about each graph.

Activities:

(Note: All graphs must adhere to the criteria for construction set forth in the Explanation of Objective.)

Day 1:

1. Give pairs of students 5 bar graphs with 5 questions that must be answered by studying the graphs. Have students record their answers. After students have completed this activity, have students take turn demonstrating and explaining their responses.

2. Allow pairs of students to study bar graphs from Activity #1 Day 1 and construct at least two bar graphs of their own. Students should also write 2 to 4 questions to be answered by studying the graph. After students have developed their graphs, have each pair of students exchange graphs with another pair of students and answer the questions for the graph.

Day 2:

1. Adapt the introduction activity to introduce pictographs. Ask students to show the number of glasses of drinks (i.e., water, milk, cola, etc.) they drink each day by drawing a small glass to represent every 3 drinks they drink each day. Choose five students and their numbers of glasses to draw a pictograph. The pictographs may look as follows:

Number of Glasses of Drinks Each Day

Students	
John	▯▯▯▯
Bob	▯▯
Sue	▯
Bill	▯▯▯▯▯▯
Mary	▯▯▯

Each symbol ▯ stands for 3 drinks.

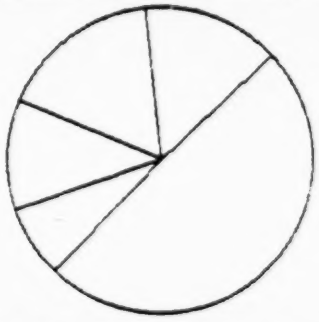
Ask students to answer questions about the graph. Demonstrate the use of and interpretation of their pictographs.

2. Adjust Activity #1 Day 1 to include pictographs.

3. Follow the same procedure as in Activity #2 Day 2 but have students construct pictographs rather than bar graphs.

Day 3:

1. Adapt the Introduction Activity to introduce circle graphs. Draw a circle on the chalkboard. Tell students to pretend the circle is a pie. Divide the pie as follows:



Say that the pie is one whole that has been divided by a family of five. Ask students which piece the father might choose and label it father. Do the same for the other family members: mother, brother, sister, and baby brother. When finished, the graph may look as follows:

Demonstrate various other circle graphs stressing the largest and smallest divisions.

2. Adjust Activity #1 Day 1 to include circle graphs.

3. Follow the same procedure as in Activity #2 Day 1 but have students construct circle graphs rather than bar graphs.

Culmination:

Have each student answer questions for each of two bar graphs, two pictographs, and two circle graphs.

Materials

Introduction:

1. Several vertical and horizontal bar graphs to demonstrate on the chalkboard

Day 1:

1. Five bar graphs with five questions for each pair of students
2. Paper on which students construct their own bar graphs

Day 2:

1. Several pictographs to demonstrate on the chalkboard
2. Five pictographs with five questions for each pair of students
3. Paper on which students can construct their own pictographs

Day 3:

1. Several circle graphs to demonstrate on the chalkboard
2. Five circle graphs with five questions for each pair of students
3. Paper on which students can construct their own circle graphs

Culmination:

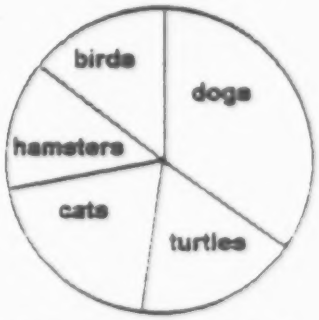
1. Two bar graphs with questions, two pictographs with questions, and two circle graphs with questions for each student

Sample Tests

Test 1

Directions: Use the graph to answer the question. Mark your choice on the answer sheet.

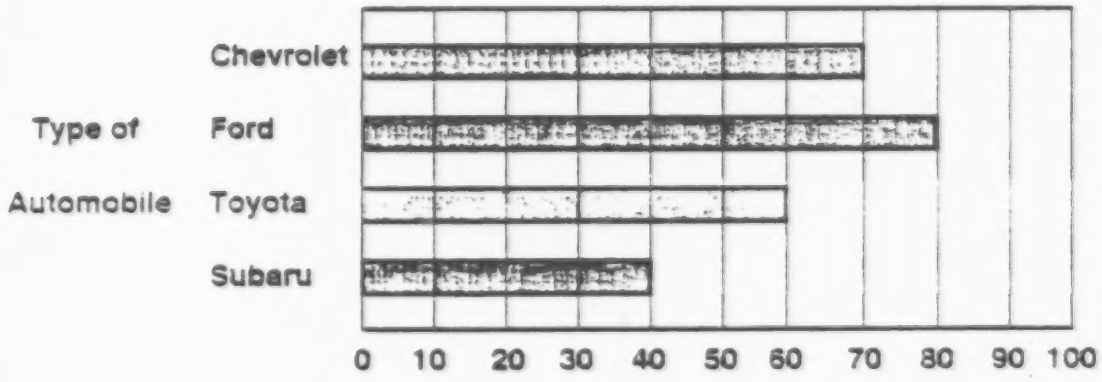
1. **Favorite Pets**



Which pet was the most favorite?

(a) dogs
(b) cats
(c) hamsters
(d) turtles

2. **Automobiles Sold in January, 1989**

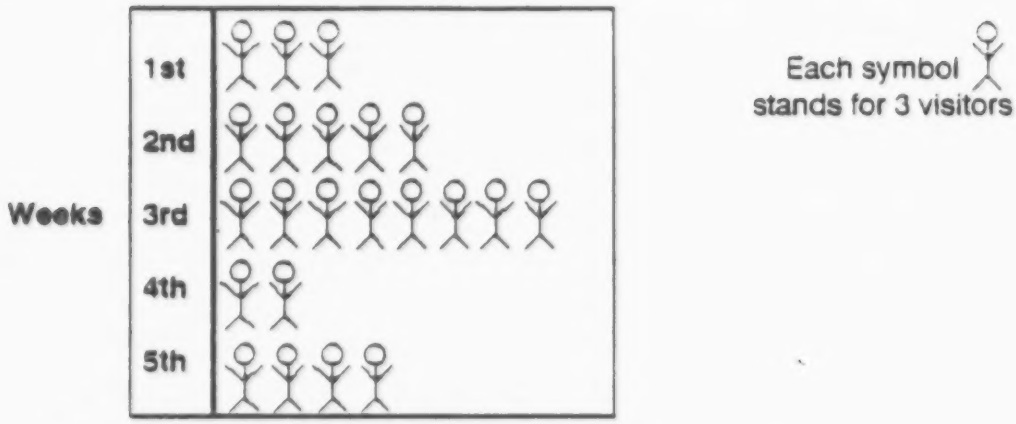


Which automobiles sold better in January, 1989?

(a) Chevrolet
(b) Ford
(c) Toyota
(d) Subaru

Test 1 (cont.)

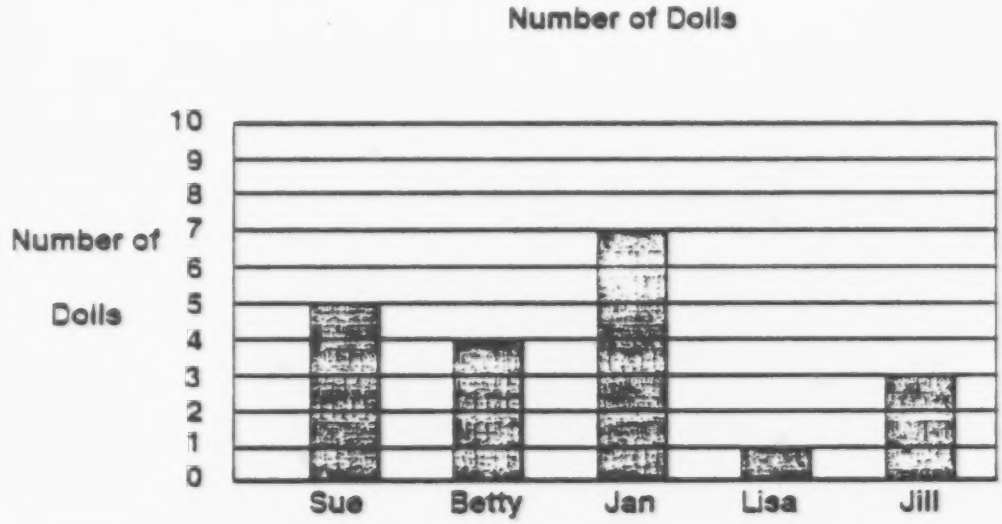
3.



How many visitors visited the park during the 1st week?

(a) 3
(b) 12
(c) 6
(d) 9

4.



How many dolls does Jill have?

(a) 1
(b) 2
(c) 3
(d) 4

Test 1 (cont.)

5. **Favorite Snacks**

What is the favorite kind of snack?

(a) candy
(b) cookies
(c) ice cream
(d) cake

6. **Days Missed in School**

Students		
	John	○○○
	Bob	○○○○○
	Bill	○○
	Tina	○
	Jane	○○○○○○○

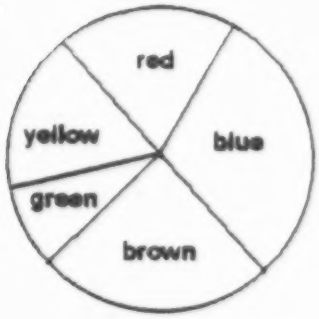
Each symbol ○ stands for 2 days.

How many days did Bob miss school?

(a) 12
(b) 10
(c) 8
(d) 6

Test 1 (cont.)

7. **Favorite Color**



What is the least favorite color?

(a) blue
(b) green
(c) red
(d) brown

8. **Number of Rocks Collected**

Students	
Tom	□□□
Mark	□
Lee	□□□□□□□□
Ann	□□□□
Kay	□□□□□□

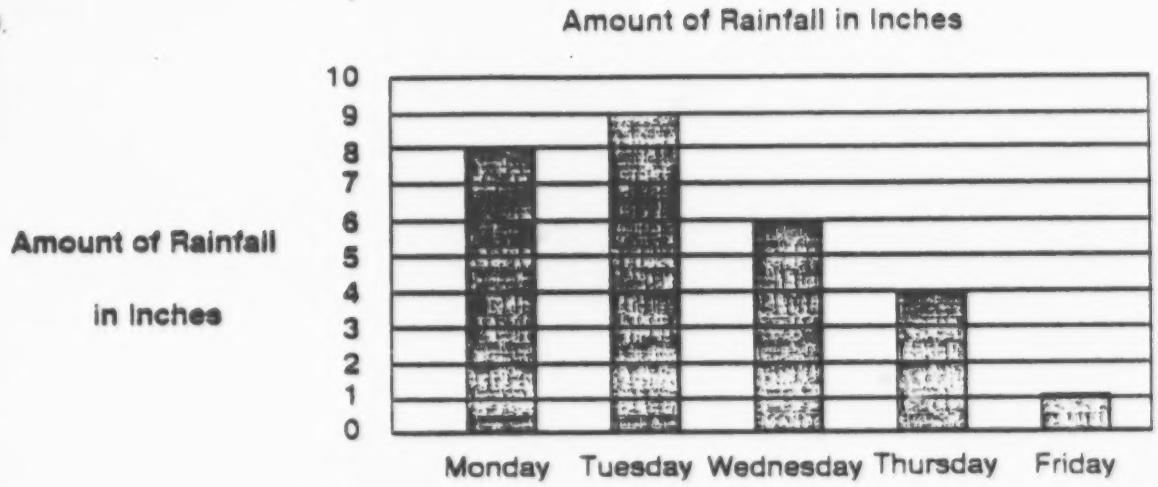
Each symbol □ stands for 5 rocks.

How many rocks did Lee collect?

(a) 30
(b) 34
(c) 40
(d) 45

Test 1 (cont.)

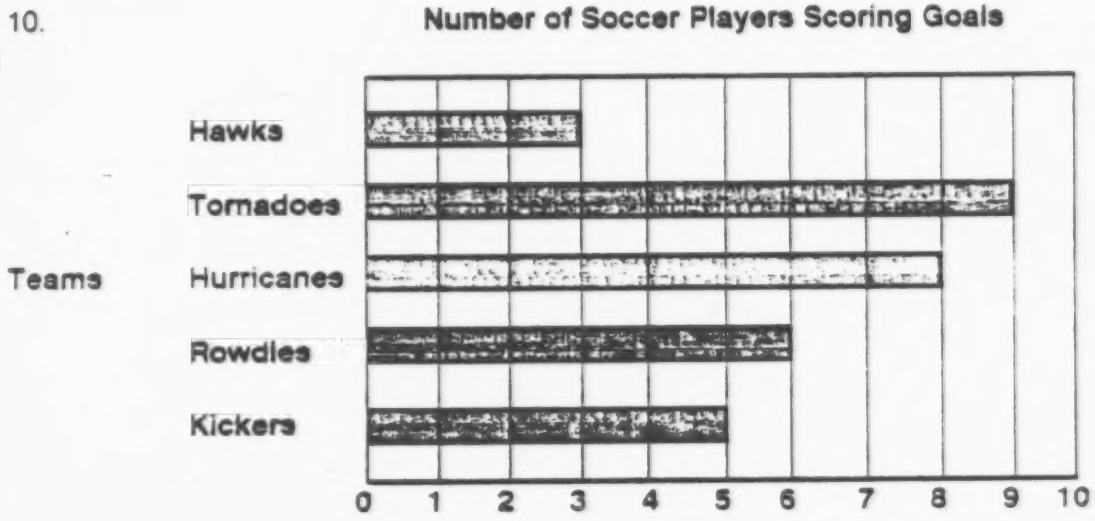
9.



What day had the least amount of rainfall?

(a) Tuesday
(b) Wednesday
(c) Thursday
(d) Friday

10.



Which team had the greatest number of soccer players scoring goals?

(a) Tornadoes
(b) Hurricanes
(c) Rowdies
(d) Kickers

Test 2

Directions: Use the graph to answer the question. Mark your choice on the answer sheet.

1. **Favorite Ice Cream Flavors**

Which ice cream flavor is liked the least?

(a) chocolate
(b) butterpecan
(c) strawberry
(d) orange

2. **Number of Circus Tickets Sold**

Days		
	Monday	△△△△△△△△△△
	Tuesday	△△
	Wednesday	△△△△△
	Thursday	△△△
	Friday	△△△△△△△

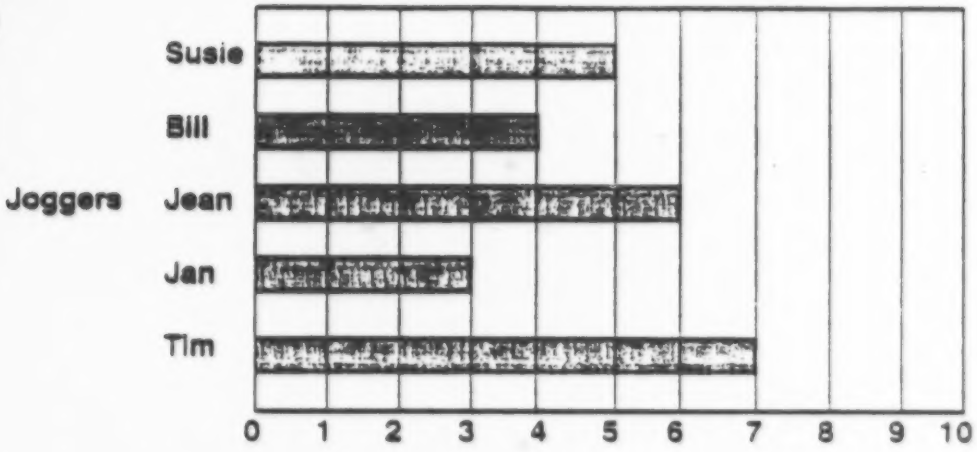
Each symbol △ stands for 4 tickets.

How many circus tickets were sold on Thursday?

(a) 4
(b) 8
(c) 12
(d) 16

Test 2 (cont.)

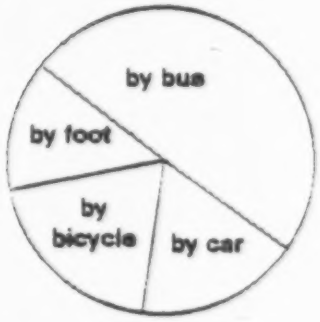
3. Number of Miles Jogged



Who jogged the greatest number of miles?

(a) Jan
(b) Tim
(c) Jean
(d) Susie

4. How Students Get to School



How do most students get to school?

(a) by bus
(b) by foot
(c) by car
(d) by bicycle

Test 2 (cont.)

5. **Number of Children Attending Summer Camp**

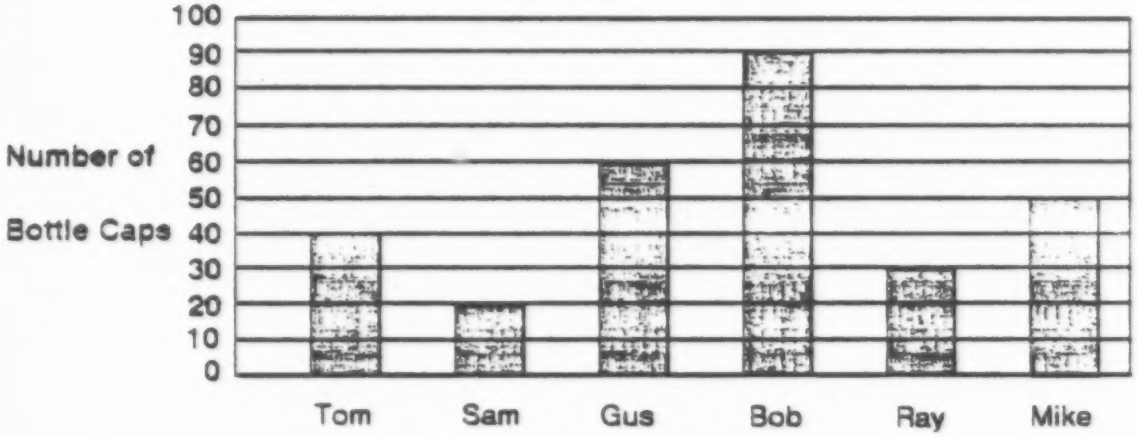
Louisiana	✓✓✓✓✓✓✓✓✓✓
New York	✓✓✓✓✓✓✓
Texas	✓✓✓✓✓
Mississippi	✓✓✓✓✓✓✓✓
Arkansas	✓✓

Each symbol ✓ stands for 5 children.

How many children attended summer camp in Texas?

(a) 20
(b) 25
(c) 30
(d) 35

6. **Number of Bottle Caps**

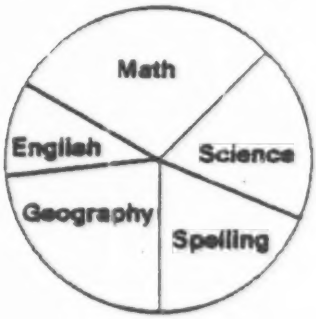


Who has the smallest number of bottle caps?

(a) Sam
(b) Ray
(c) Mike
(d) Tom

Test 2 (cont.)

7. **Favorite School Subjects**



What school subject is liked the most?

(a) Geography
(b) Math
(c) Spelling
(d) English

8. **Number of Lawns Mowed**

George	○○
Mary	○
John	○○○
Kim	○○○○○○○
Henry	○○○○○

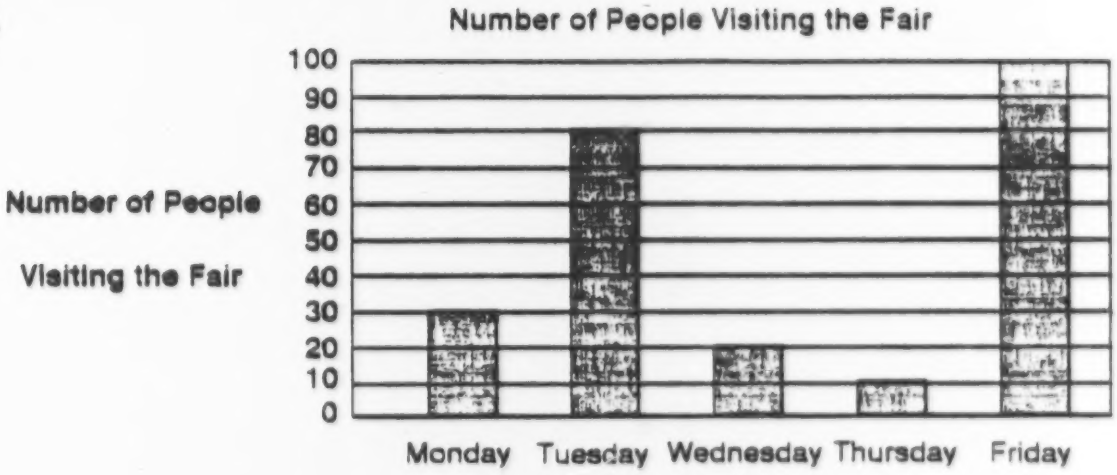
Each symbol ○ stands for 7 lawns.

How many lawns did Henry mow?

(a) 21
(b) 28
(c) 35
(d) 42

Test 2 (cont.)

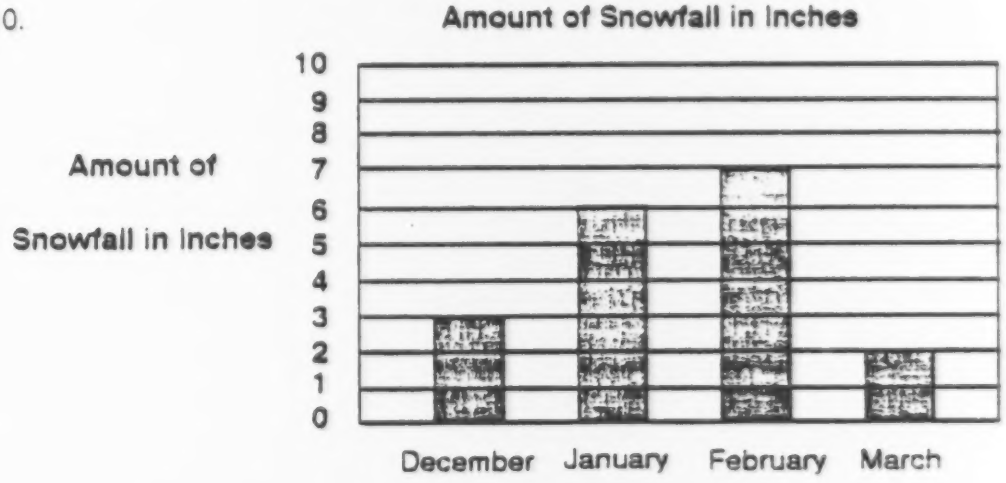
9.



On what day did the greatest number of people visit the fair?

(a) Tuesday
(b) Wednesday
(c) Thursday
(d) Friday

10.



What month shows the least amount of snowfall?

(a) December
(b) January
(c) February
(d) March